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ABSTRACT

This progress report on Project TALENT, covering the period 1 June 1972 - 31 August 1972, contains five sections. The sections are as follows: I. Major Activities during This Quarter (reports on 73 different tasks); II. Activities Planned during the Next Quarter (related to 9 tasks); III. Utilization, Dissemination, and Recognition of Outcomes of Activities; IV. Compliance with Requirements; and V. Staff Summary. The project work concerns data collected from 9th, 10th, 11th, and 12th grade students and by use of questionnaires, administered at varying times, in relation to careers, processing the data, and publishing and disseminating the data. (DB)

AIR-26500-5/72-TPR(5)

TECHNICAL PROGRESS REPORT NO. 5

Project No. 0-0742

Grant No. OEG-0-71-3459

United States Office of Education

Period Covered by Report: 1 June 1972 - 31 August 1972

Title of Project: Project TALENT

Responsible Investigator: John C. Flanagan

I. MAJOR ACTIVITIES DURING THIS QUARTER

Task 01 - General Administration (organizing, integrating, and merging the tasks of the project).

During the past quarter TALENT moved to management by objectives with individual staff members responsible for meeting their objectives within pre-arranged financial limitation.

Our in-house weekly reports have been developed into vehicles which report not only progress made in relation to expectations but also serve as a tool for continuous updating of our management plan.

Several different tasks and subtasks within the project have been PERT charted, but as yet a comprehensive PERT chart of the project in totality has not yet been attempted.

Budgeting work is continual and all tasks currently are being accomplished within their projected budget.

All letters received from subjects and interested parties have been answered individually utilizing AIR's MT/ST capabilities.

Task 02 - Mailer Tape Updating (keeping our capacity to contact subjects current)

As was mentioned in the previous report, all possible updating of names and addresses was accomplished prior to mailing the 1972 TALENT News. As of 8/24/72 128,230 News' had been returned by the Post Office. Many of these indicated new addresses which are being entered into our mailer tape file.

The major objective of this task during the past quarter has been to update every possible 11th grade address prior to the mailing of Wave One of this year's questionnaire (see Task 22). To this end, over 13,000 name/address changes were corrected on our 11th grade mailer tape prior to the tape's dispatch to National Computer Systems on 8/20/72.

Other work done under this task included entering corrected names and addresses on the 12th grade tape from the returned questionnaires (c. 18,000 updates made) and starting the updating for grades 9, 10, and 12 from the returned TALENT News. The volume of this updating is so heavy that it will be evened off throughout the next three quarters but in time for the hoped for mailing of a 1973 TALENT News prior to our 10th grade survey.

In addition to utilizing the returned questionnaires and News for obtaining new addresses, numerous telephone books have been obtained for use on "No such number" or "No such street" returns. This has proved to be a very useful method of resurrecting "dead" addresses.

Task 03 - Computer Program Library (maintaining, and revising when needed, computer programs which the staff and Data Bank customers use rather frequently).

A great deal of additional effort was devoted to bringing a Systems Standards Manual into being for TALENT. As of this writing final revisions are being made. This Manual which will be implemented in the near future will facilitate and standardize approaches to the completion of future work. A systems approach is planned for initiation of all future jobs. This will provide a task list, personnel assignments, a schedule, and a means of making financial estimates and controlling work in process.

Work was done as needed on installing and checking out programs for the TALENT Tape Library. In addition a staff member was designated as "Tape File Librarian" to ascertain that our files remain current on a day-to-day basis.

Task 04 - Master and Basic Special Tape Files (creating and maintaining file of basic case records and associated intermediate files of basic data for general studies).

New systems procedures were exercised on order to solve a number of annoying systems problems which have endured for several years. These procedures resulted in: a) straightening out of garbled names which have prevented prior preparation of a needed new alphabetic directory of TALENT subjects; b) the construction of an intricate plan to locate and correct several small sets of data which have so far remained unmerged: and c) the construction of a systems approach to desired future work on recomputing and printing norms, completing preparation of the master tape for a 4% sample of cases involving item responses, preparation for adding 1963 retest data to master tapes.

A new tape format procedure was instituted and control of tape use was improved.

Finally, after careful provision for storage of all original data which were to be saved, the remainder of the original records were destroyed under our supervision.

Task 05 - Ninth Grade Five Year Follow Up Tapes (preparing tapes of basic followup data for the ninth grade, five year questionnaire and merging the data with master file data).

This task is in hold status pending completion of computation of new weights described in Task 36.

Task 06 - Pre-computer Processing of Ninth Grade, Five Year Special Questionnaire (securing and coding responses of a special sample of original non-respondents).

This task has been completed.

Task 07 - Dissemination (preparing, publishing, and disseminating generalized reports of TALENT's findings and possibilities).

Bulletin No. 7, reporting the results of Five Years After High School for the general educational community was printed and mailed.

In connection with mailing the Bulletin a "general" mailing list has been established which will be augmented in the future. We are presently discussing the easiest way to enter this into the computer so it is simple to update and readily available either alphabetically or in zip code order.

Task 08 - Open

Task 09 - Advisory Panel Meeting, 1971 (seeking and using the advice of experts in careers and social effects on careers).

This task has been completed.

Task 10 - Advisory Panel Meeting, 1972 (seeking and using the advice of experts in careers and social effects on careers).

It was determined in meeting with the Monitor not to hold an Advisory Panel Meeting in 1972.

Task 11 - Advisory Panel Meeting, 1973 (seeking and using the advice of experts in careers and social effects on careers).

No activity as is to be expected.

Task 12 - Open

Task 13 - TALENT News - 1971 (updating addresses for TALENT subjects and keeping them interested in supplying additional information about their careers upon request).

This activity has been completed.

Task 14 - TALENT News - 1972 (updating addresses for TALENT subjects and keeping them interested in supplying additional information about their careers upon request).

The TALENT News - 1972 was printed and mailed this quarter. The total mailing (after removal of "bad" 12th grade addresses) went to 389,382 participants residing in the U.S. and 495 participants who reported foreign addresses.

Following receipt of their copy of the News many participants sent us both criticisms and constructive suggestions in relation to eleven-year survey questionnaires. Many included fragments of autobiographies, some of which will be very useful in illustrating points brought out by TALENT statistical data.

Task 15 - TALENT News - 1973 (updating addresses for TALENT subjects and keeping them interested in supplying additional information about their careers upon request).

Not yet active. Activity contingent upon renewal of grant.

Task 16 - Open

Task 17 - Preparation of 12th Grade Questionnaire (preparing to update the educational and occupational histories of 12th grade subjects and to augment their data by matters of current interest in the quality of living, scientific careers, and work in women's life patterning).

This task has been completed.

Task 18 - Preparation of 11th Grade Questionnaire (preparing to update the educational and occupational histories of 11th grade subjects and to augment their data by matters of current interest in the quality of living, scientific careers, and work in women's life patterning).

We received written approval for our questionnaire early in the quarter and sought bids from those organizations having optical scanning capabilities for the printing and processing of this questionnaire. A Purchase Order was written to NCS who had the low bid and did the same work for us last year. A copy of the Purchase Order was submitted for approval which we received verbally enabling NCS to proceed on schedule with the printing (see Task 22).

Task 19 - Preparation of 10th Grade Questionnaire (preparing to update the educational and occupational histories of 10th grade subjects and to augment their data by matters of current interest in the quality of living, scientific careers, and work in women's life patterning).

Not yet active. Activity contingent upon renewal of grant.

Task 20 - Open

Task 21 - Mailing, Collecting, Preliminary Processing, Coding, and Machine Reading of 12th Grade, 11 Year Follow Up Questionnaire.

Coding of "straggler" questionnaires and questionnaires received from the special sample (see Task 25) continued during the quarter.

In June, staff visited NCS to check all the programs for accuracy and reliability. Following their check, approval was given to process the questionnaires.

In mid-July a copy of the output tape for the first 25,725 12th grade 11-year questionnaires was received from NCS as well as option by item distribution printouts for these cases. The questionnaires themselves have also been returned to us.

Only about 50 "problem questionnaires" were encountered during processing which were returned to us for correction and resubmitted for optical scanning.

Task 22 - Mailing, Collecting, Preliminary Processing, Coding, and Machine Reading of 11th Grade, 11 Year Follow Up Questionnaire.

The mailing schedule for this questionnaire has been set as follows:

Item	Mailing date	Subjects with mail type
Wave 1	9/7	All 11th graders. Mail via bulk rate.
Postcard	9/21	All 11th graders. Mail via bulk rate.
Wave 2	9/28	All 11th graders. Mail via bulk rate.
Wave 3	11/16	Eliminate prior respondents. Those whom the P.O. has been unable to reach will be sent a new questionnaire in a distinctively colored and printed open-window envelope via first class mail. (Guess is that this will be about 20,000 subjects.) Others not heard from will again be contacted via bulk rate mailing.
Wave 4	1/18	Eliminate additional respondents. All remaining subjects sent questionnaire via bulk rate mailing.

Things are so far proceeding on schedule.

Task 23 - Mailing, Collecting, Preliminary Processing, Coding, and Machine Reading of 10th Grade, 11 Year Follow Up Questionnaire.

Not yet active.

Task 24 - Open

Task 25 - Special Follow Up of 12th Grade, 11 Year Nonrespondent Sample (getting data when we know subjects currently belong to a category who failed to reply to any one of the four waves of mailed questionnaires).

This activity is nearing an end. As of this writing, only about 100 of the 2500 questionnaires sent out to regional coordinators have not yet been returned. These coordinators are being called and asked to return them.

Of those returned, over half of the nonrespondent sample have been located and questionnaires completed. In addition work is being pushed to locate remaining subjects directly from AIR in regions where coordinators failed to expend the needed effort to carry out their job. Results have been quite good.

Task 26 - Special Follow Up of 11th Grade, 11 Year Nonrespondent Sample (getting data when we know subjects currently belong to a category who failed to reply to any one of the four waves of mailed questionnaires).

Not yet active.

Task 27 - Special Follow Up of 10th Grade, 11 Year Nonrespondent Sample (getting data when we know subjects currently belong to a category who failed to reply to any one of the four waves of mailed questionnaires).

Not yet active.

Task 28 - Open

Task 29 - Update Tape File, 12th Grade, 11 Year Questionnaire (merging data received in the 11 year follow up onto tapes containing previous data on subjects).

This will not become active until more of the 12th grade, 11 year questionnaires have been processed and weights have been determined and applied.

Task 30 - Update Tape File, 11th Grade, 11 Year Questionnaire (merging data received in the 11 year follow up onto tapes containing previous data on subjects).

Not yet active.

Task 31 - Update Tape File, 10th Grade, 11 Year Questionnaire (merging data received in the 11 year follow up onto tapes containing previous data on subjects).

Task 32 - Open

Task 33 - Research Studies Based Primarily on Five Year Follow Up Data (not including eleven year follow up data) (conducting policy, scientific, and 'census' studies as negotiated from time to time with Office of Education and National Science Foundation).

The plan for conduct of a study which ascertains the relative stability of occupational groupings from test predictions and from subject statements when classified according to the Holland, Roe, and Flanagan systems was modified. Various alternatives for reducing the number of occupational groups and TALENT variables were considered. This revised study was submitted for costing which was much higher than expected. Alternate study plans at various price ranges are therefore now still under consideration.

Little could be done on the proposed study of multiple careers because of the necessary priority placed on preparing the Counselor's Handbook (see Task 38).

Suggestions for several additional research studies have been put forward but no formal work on them has been initiated.

Task 34 - Incidences and Probabilities (determining numbers and percents of responses to the several questions asked).

The incidences and probabilities for grades 12, 11, and 10 have been typed and proofed. Grade 9 is in a hold status pending completion of Tasks 36 and 37. Plans for report of these data are under discussion.

Task 35 - Ribick Study (determining the value of education in several regions of the country).

Our work on this Task is complete until Professor Ribick shares his results with us. No schedule has yet been adopted.

Task 36 - Weighting and Bias (ascertaining the degree to which available control data can further correct for any bias in our data following the special sampling procedure).

The needed tapes for this study have been completed. New decisions need to be made prior to final completion in the near future.

Task 37 - Recoding of Needed Initial Data on Some Ninth Grade Cases (completing the original data on the ninth grade).

All data involved in this were keypunched. A keypunch sample was checked revealing an accuracy rate of 99.98% of strokes sampled. Work is currently in progress on a test scoring program and a composites reformatting program.

Task 38 - Counselor's Handbook (reframing the results of the five year career studies for easy use by counselors).

Required statistics were completed for the Handbook. Draft of four chapters was completed and reviewed. A new format is now being implemented. Descriptions are being written for all occupations. A table is being readied for data reduction prior to final plotting of long-range career group and occupational profiles which will be included in the Handbook. Robert Gagné has been advising on the objectives, format, and content of the Handbook.

Task 39 - Progress in Education Study.

Distribution of this well-received report continues. Reprinting has been ordered.

Task 40 - Cureton Report

A report equating TALENT tests with several commercially available tests is ready for typing, but has been held up because of press of other work. The report is currently being entered into the typing and printing process.

Task 80 - Research Studies Involving Eleven Year Follow Up Data (conducting policy, scientific, and 'census' studies as negotiated from time to time with Office of Education and National Science Foundation).

These studies are awaiting assembly of data and consensus on plans noted under Task 33.

DATA BANK

Inquiries continued to be received and answered concerning capabilities of the Data Bank. During the past quarter:

1. Distribution of the Data Bank Handbook has continued.

2. The proposal mentioned in last quarter's report to the Air Force Saber Volunteer Group has been funded.

3. The review of Data Bank studies continued as time became available.

STUDIES OF SCIENTIFIC CAREERS

Monies have been provided by NSF to TALENT under Interagency Agreement No. NSF-CA53 to undertake studies focused specifically on scientific personnel and career fields in the scientific area. Now that complete 5-year data are almost ready for use, a plan for a program of studies has been begun following a literature search.

II. ACTIVITIES PLANNED DURING THE NEXT QUARTER

Task 01 - General Administration

Using the individual task and subtask PERT charts mentioned in Section I, an overall PERT chart will be derived. Because of the complexity of the whole project the overall chart will refer to the more detailed task charts.

Plans call for the establishment of graphic portrayals of expenses vs. budgeted funds in relation to time on each task.

Replies to letters will be prepared on an as-received basis.

Task 02 - Mailer Tape Updating

Work will continue on updating our mailer tape on a continuing basis. Special attention will be focused on updates from the Post Office returned from Wave One and Two questionnaires, in order to reach more subjects on Wave Three.

Task 03 - Computer Program Library

In spite of our plans reported for this quarter in the last report, the TALENT Systems Standards Manual has not been completed. However, currently it is on the threshold of completion with final corrections currently being made prior to printing and implementing which will occur within the next two weeks.

Task 04 - Master and Basic Special Tape Files

PERT charts for further work on garbled names and for the elimination of conditions blocking merger of small sets of data will be implemented. Completion of this work is anticipated during the next quarter.

Task 05 - Ninth Grade, Five Year Follow-Up Tapes

Missing cases and new weights should be ready soon. We will then complete this task.

Task 06 - Pre-computer Processing of Ninth Grade, Five Year Special Questionnaire.

This task is finished and no future activity is expected.

Task 07 - Dissemination

In addition to the plans reported last quarter for some general, popular articles on TALENT as soon as data are available, plans are being made to produce a brochure describing TALENT's history and objectives for utilization in replying to the many requests for descriptive information on the project.

Task 08 - Open

Task 09 - Advisory Panel Meeting, 1971.

This task is finished and no future activity is expected.

Task 10 - Advisory Panel Meeting, 1972.

No activity expected.

Task 11 - Advisory Panel Meeting, 1973.

No activity expected unless dictated by future discussions.

Task 12 - Open

Task 13 - TALENT News - 1971.

Completed.

Task 14 - TALENT News - 1972.

Completed.

Task 15 - TALENT News - 1973.

Further planning for the next issue will proceed. It is also anticipated that some preliminary writing will be started. Work will not be pushed too fast until contingency concerning refunding has been settled one way or the other.

Task 16 - Open

Task 17 - Preparation of 12th Grade Questionnaire.

Completed.

Task 18 - Preparation of 11th Grade Questionnaire.

Upon completion of printing the 11th grade, 11 year follow-up questionnaire scheduled for next week, this task will be completed.

Task 19 - Preparation of 10th Grade Questionnaire.

Not yet active, but comments on the 11th grade questionnaire by participants will be compiled for use in this Task later in the year. Work will not be pushed too fast until contingency concerning refunding has been settled one way or the other.

Task 20 - Open

Task 21 - Mailing, Collecting, Preliminary Processing, Coding, and Machine Reading of 12th Grade, 11 Year Follow Up Questionnaire.

This task is essentially completed. However, questionnaires continue to straggle in daily. These will be coded and sent in batches to NCS for optical scanning and adding to the master tape. This activity is likely to continue for quite awhile (we are still occasionally receiving 5 year follow-up questionnaires!).

Task 22 - Mailing, Collecting, Preliminary Processing, Coding, and Machine Reading of 11th Grade, 11 Year Follow Up Questionnaire.

As noted under this task in Section I of this report, mailing of the 11th Grade 11 Year Follow-up Questionnaire is scheduled to begin 7 September 1972. Based on experience gained last year, plans have been made to carry out the requirements of this task in the most expeditious manner.

Task 23 - Mailing, Collecting, Preliminary Processing, Coding, and Machine Reading of 10th Grade, 11 Year Follow Up Questionnaire.

Not yet active.

Task 24 - Open

Task 25 - Special Follow Up of 12th Grade, 11 Year Nonrespondent Sample.

As was reported under this task in Section I, work is nearing completion. However, efforts will still be made to either reach those in sample not contacted by the coordinator or write them off as a "dead end." None will be "dead ended" without every of several methods of reaching them having been tried.

Following the above, each coordinator's work will be evaluated and put on record for use under Task 26. Some replacements will be necessary. A comprehensive analysis of the procedures will be made with an aim of correcting any weak points which may exist.

Task 26 - Special Follow Up of 11th Grade, 11 Year Nonrespondent Sample.

Not yet active.

Task 27 - Special Follow Up of 10th Grade, 11 Year Nonrespondent Sample.

Not yet active.

Task 28 - Open

Task 29 - Update Tape File, 12th Grade, 11 Year Questionnaire.

Task 30 - Update Tape File, 11th Grade, 11 Year Questionnaire.

Not yet active.

Task 31 - Update Tape File, 10th Grade, 11 Year Questionnaire.

Not yet active.

Task 32 - Open

Task 33 - Research Studies Based Primarily on Five Year Follow Up Data.

Other planned studies will be initiated according to an agreed upon priority scheme as financial resources permit.

Task 34 - Incidences and Probabilities.

Completion awaits completion of Tasks 36 and 37 noted below.

Task 35 - Ribick Study.

Response contingent on requests from Ribick.

Task 36 - Weighting and Bias.

Completion and report expected in next quarter. Implementation to other grades will then be undertaken in light of findings of this study.

Task 37 - Recording of Needed Initial Data on Some Ninth Grade Cases.

Within the next month these data will be ready for merging with master file data and the task will be completed.

Task 38 - Counselor's Handbook.

Following completion of chapters on two long-range career groups using new format, counselors will be consulted to gain their perspective prior to drafting remaining chapters. This work has a very high priority at this time and will be pressed to conclusion as rapidly as possible. However, it may be the end of the quarter before a printed Handbook sees the light of day.

Task 39 - Progress in Education Study.

This task is now complete.

Task 40 - Cureton Paper.

We will have this report published next quarter.

Task 80 - Research Studies Involving Eleven Year Follow Up Data.

An analysis plan will be devised and worked towards consensus during the next quarter.

DATA BANK

1. Distribution of the Data Bank Handbook will continue as requests are received.

2. Several new studies are planned, but no plans are firm at present.

STUDIES OF SCIENTIFIC CAREERS

A plan of studies will be drafted and discussed with relevant parties prior to its implementation.

III. UTILIZATION, DISSEMINATION, AND RECOGNITION OF OUTCOMES OF ACTIVITIES

During this quarter there were no presentations made nor publications issued related to TALENT.

IV. COMPLIANCE WITH REQUIREMENTS

1. There have been no departures from the original research plan.

2. All questionnaires used in Project TALENT have been approved by the Office of Education.

V. STAFF SUMMARY

1. Persons paid from Federal funds who worked during the period covered in this report:

Regular Staff

Director:	David V. Tiedeman
Associate Director:	Marion F. Shaycoft
Director of the Data Bank:	John G. Claudy

Computer and Research Staff:
Joan Altick
Wendy B. Bartlett
Ardys J. Bloomquist
Gary V. Fulscher
Richard T. Johnson
Yungho Kim
Michael J. Wargo
Mary B. Willis
Jay A. Woods
Calvin E. Wright

Administrative Staff:
Sibyl O. Anderson
Nancy K. Brunstetter
Emily Campbell
Paulette Doudell

Coding Staff:
Nancy Carr
Charlotte Doudell
Jay Egan
Barbara Fagan
Melissa Gill
Martha Gregory
Kathleen Williams

Temporary Staff

Coding Staff:
Melanie Austin
Rebecca Bolitho
Diana Carr
Gail Chalupsky
Karen Chew
E. Tracy Cole
Katherine Cole
Paul Coppock
Brad Goodman
David Grandstaff
Mary Hurst
Rhoda Jones
Robert Maus
Stephanie Porter
Clifford Potts
Thomas Renaghan
Barbara Schlageter
Sylvia Siegel
Elise Simms
Karen Sorenson
Susan Turner
Margaret Walz
Deborah Weiner
Bobbye Wolf
Damon Wright

2. Persons paid from Federal funds who transferred to other projects or terminated as staff members of Project TALENT during the period covered in this report:

Regular Staff:	Richard T. Johnson Jay A. Woods
Temporary Staff:	Karen Chew Rhoda Jones Thomas Renaghan Elise Simms Margaret Walz Deborah Weiner Damon Wright

3. Persons paid from Federal funds who joined Project TALENT during the period covered in this report:

Regular Staff:	Sibyl O. Anderson Michael J. Wargo Calvin E. Wright
Temporary Staff:	Melanie Austin Rebecca Bolitho Diana Carr Gail Chalupsky E. Tracy Cole Katherine Cole Brad Goodman David Grandstaff Robert Maus Clifford Potts Barbara Schlageter Sylvia Siegel Elise Simms Karen Sorenson Susan Turner Bobbye Wolf Damon Wright

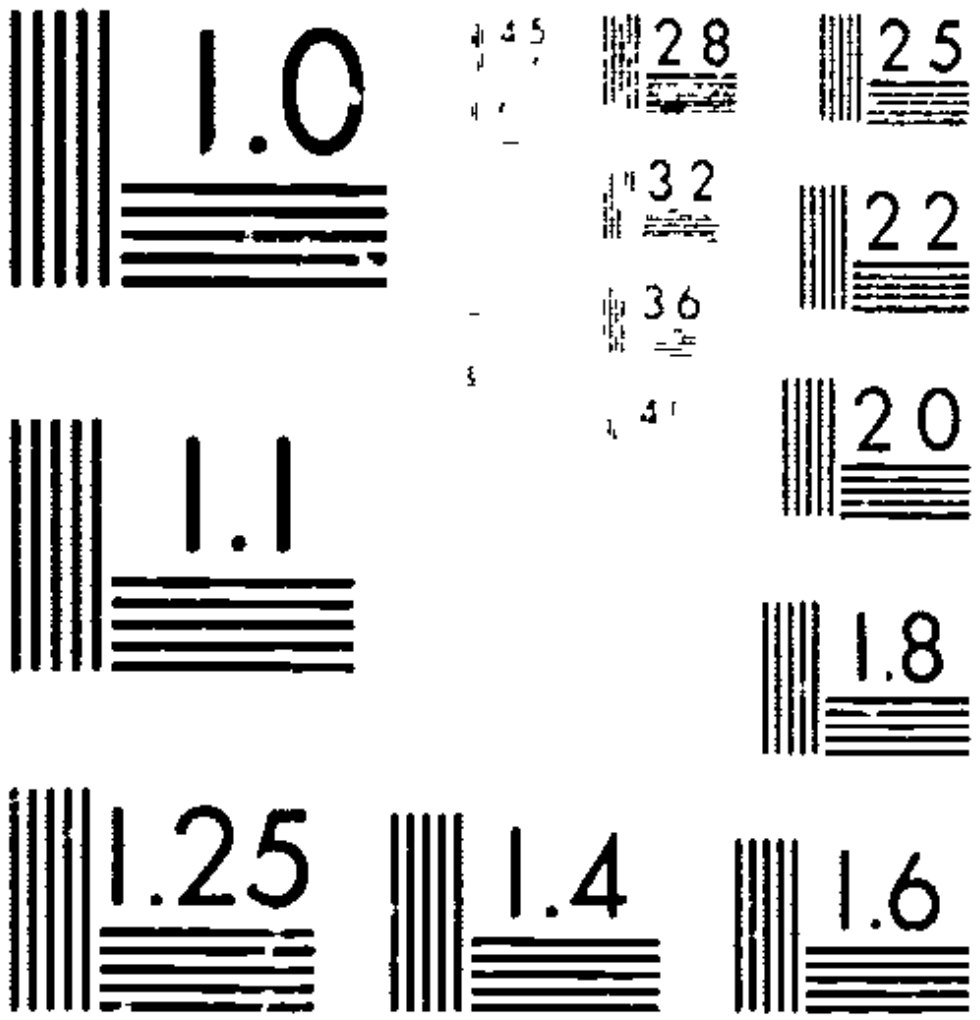
4. Persons paid from other sources:

Responsible Investigator:	John C. Flanagan (1/4 time)

Date: 1 September 1972

Signature of Project Director

David V. Tiedeman



MICROCOPY RESOLUTION TEST CHART

DOCUMENT RESUME

ED 073 135 TM 002 379

AUTHOR	Gibney, Thomas
TITLE	Evaluation of 1970 Summer Institutes for Secondary School Teachers of Sciences and Mathematics Programs.
INSTITUTION	Toledo Univ., Ohio. Center for Educational Research and Services.
SPONS AGENCY	National Science Foundation Washington, D.C.
PUB DATE	15 Jul 71
NOTE	179p.
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DESCRIPTORS	Educational Research; *Instructional Improvement; Mathematics Teachers; *Program Evaluation; Questionnaires; Science Teachers; Secondary School Teachers; Statistical Data; Summer Institutes; Tables (Data); *Teacher Characteristics; *Teacher Education

ABSTRACT

To determine the impact of Summer Institutes on the professional activities and competence of the participants, a questionnaire was sent to 5,452 participants of 1970 Summer Institutes approximately 16 months after they had returned to their classrooms. Completed questionnaires were returned by 4,476 participants. Several demographic characteristics of participants were obtained, and detailed analyses are provided for many of these characteristics. More than two-thirds of the respondents stated that new curriculum materials had been implemented in their classroom, either in whole or in part. Approximately one-third of the participants reported that a change in assignment or status had occurred because of their institute attendance. The participants perceived that inservice education would best serve to bring about classroom improvement. Included in the report and its appendices are discussions of the extent of constructive action taken in the classroom, as well as feelings of professional growth resulting from institute attendance; the actual subjects taught and teaching loads are also presented. Previous participantion in NSF institutes is analyzed in detail by age, sex, and extent of previous institute experience. Numerous tables and eight appendixes are included. (For related documents, see TM 002 380, 381.) (DB)

EVALUATION OF 1970 SUMMER INSTITUTES FOR SECONDARY SCHOOL TEACHERS OF SCIENCES AND MATHEMATICS PROGRAMS

Prepared for
National Science Foundation
Contract NSF-C677

THOMAS GIBNEY

CENTER FOR EDUCATIONAL RESEARCH AND SERVICES
COLLEGE OF EDUCATION
THE UNIVERSITY OF TOLEDO
Toledo, Ohio 43606

EVALUATION OF 1970 SUMMER INSTITUTES FOR SECONDARY SCHOOL TEACHERS OF SCIENCES AND MATHEMATICS PROGRAMS

Prepared for
National Science Foundation
Contract NSF-C677

THOMAS GIBNEY

Principal Investigator
Center for Educational
Research and Services

July 15, 1971

COLLEGE OF EDUCATION
THE UNIVERSITY OF TOLEDO
Toledo, Ohio 43606

ABSTRACT

The National Science Foundation supported an effort to evaluate the 1970 Summer Institutes for secondary school teachers of science and mathematics. Under contract to the Foundation, the Center for Educational Research and Services, College of Education, University of Toledo, conducted a study to determine the impact of Summer Institutes on the professional activities and competence of the participants which focused on: (1) the changes in teaching practices, new assigned duties and evidence of professional growth that could be directly attributed to attendance at a 1970 Summer Institute, (2) an inventory of educational needs as perceived by classroom teachers and supervisors for different disciplines, (3) the extent to which the participants' Summer Institute experiences met their perceived educational needs, (4) a comparison of the rankings of the 1970 Summer Institute objectives by institute directors with rankings by their participants, and (5) a record of the extent new curriculum projects were implemented into schools by the participants.

The 1970 Summer Institutes were divided into two groups. A Census group was composed of institutes possessing special features, which made it desirable to obtain information from each participant. A remaining group was then composed of institutes from which information was desired from a random sample of ten per cent of the participants. The designation of institutes in each of the two groups was provided by the Foundation.

The questionnaire, developed jointly by the project staff and NSF personnel, was sent to 5,452 participants of 1970 Summer Institutes approximately sixteen months after they had returned to their classrooms. This period of time allowed each participant one full school year and the

beginning of a second academic year after attending the Summer Institute to allow the influence of the Summer Institute experience to help bring changes within his school or classroom. Completed questionnaires were returned by 4,476 participants for a return rate of 82 per cent. This was a very high rate of return for an extensive survey employing a long (five page) questionnaire, and seemed to reflect the participant's continuing identification with a favorable attitude toward the Summer Institute program.

Teacher Characteristics. Several demographic characteristics of participants were obtained and detailed analyses are provided for many of these characteristics. Some of the results are summarized below.

The age-sex distributions for Institute subgroups showed marked differences in representation of males and females in various age categories. For example, in Mathematics institutes there was a decided peak in numbers of 30 to 39 year old males, but females in this age group showed the lowest number of participants. A markedly different trend was found in the 30 to 39 age group for Science participants. In both discipline areas the over 30 age groups showed the highest ratios of female to male participants.

A comparison of age-sex data obtained by this study with data obtained by the Foundation in 1968-69 on a sample of all mathematics and science teachers in the country revealed general contrasts between the two sets of age-sex distributions by discipline. Among many other observations, it was noted that over 50 per cent of the mathematics teachers in the United States were under 30 years of age, while only 40 per cent of the participants in the 1970 Summer Institutes were under 30. Relatively more Institute participants fell into the 30 to 39 age group than occurred in the teacher population.

A comparison of 1970 teaching assignment distributions showed that senior high school teachers attended Sequential institutes more than Unitary institutes, with the reverse trend for junior high school teachers. The same trend was exhibited for institute levels (indicating educational qualifications required for attendance); senior high school teachers attended more advanced institutes than junior high teachers.

Implementing New Course Materials. About 10 per cent of the 1970 Summer Institutes could be described as "Implementation Institutes." They were primarily devoted to helping teachers implement a specific new curriculum into their classrooms and schools. All of these institutes were included in the Census group, and a special section was added to the questionnaire for these participants designed to elicit the extent of actual implementation. More than two thirds of the respondents stated that the new curriculum materials had been put to use in their classrooms either in whole or in part (many curriculum projects are designed for incorporation of units into an existing course, as well as for replacement of an entire course.) About one third of the participants attended these institutes to help them decide whether they should adopt the new curriculum and a similar proportion attended because they were already committed to teaching it.

Changes in Assignment or Status. Approximately one third of the participants reported that a change in assignment or status had occurred because of their institute attendance. In general, those who had attended implementation institutes had more changes in their professional duties and status than participants who attended non-implementation institutes. Twenty-two per cent of the implementation institute participants reported that they were involved with inservice training of other teachers, while 10 per cent

of the non-implementation sample reported inservice training involvement. Participants from both the implementation group (30 per cent) and the non-implementation group (23 per cent) were active in curriculum development in their schools that was directly attributable to their 1970 Summer Institute attendance. About 75 per cent of all the participants listed at least one significant change in their status or teaching assignment attributable to Institute attendance.

Educational Needs for Classroom Improvement. The 1970 Summer Institute participants perceived that inservice education would best serve to bring about classroom improvement. However, what they thought this inservice education should entail varied with the kind of Institute they attended. The non-implementation group stressed most the needs of updating teachers' subject matter backgrounds and in depth teacher education. They reported that their Summer Institutes satisfied these needs best, along with providing teacher refresher training. Student learning needs which included helping the able student, individualizing instruction, adopting inductive methods of teaching, and getting students actively involved in the learning process were also ranked high. Their institutes did help with the able learner, but less so with other student based needs. The implementation institute participants rated the student based needs as most important, and reported a higher attainment of needs met. Group variations are numerous for different items along the disciplines.

Additional Results. Among the many kinds of data and comparisons presented in the text and appendices are reports on the extent of constructive action taken in the classroom as well as feelings of professional growth resulting from institute attendance. The actual subjects taught and

teaching loads, according to discipline of the institute attended, are also presented. Considerable variations in teaching loads existed within institute types and disciplines.

Previous participation in Foundation institutes is analyzed in detail, by age, sex, and extent of previous institute experience. Marked differences were shown between the sexes in ages and rates of attendance. Discipline differences in attendance were also notable. For example, 68 per cent of the Social Science participants were attending Foundation institutes for the first time, and over 30 per cent of the Mathematics and Science participants were also first time attendees. First time attendance was over 40 per cent for junior high school teachers of General Science institutes. However, over 30 per cent of the Chemistry institute participants were classed as having had a heavy pattern of previous institute participation while only 15 per cent of the Mathematics institute participants were heavy attendees. Well over 40 per cent of the participants in two of the implementation projects, Harvard Project Physics and Engineering Concepts Curriculum Project, were heavy attendees.

The analyses, determined cooperatively by the National Science Foundation and the project staff, combined the data and contrasted separate institute types in a manner which maximized the useful information needed for National Science Foundation policy decisions. The organization of data was designed to show the effects of various kinds of Summer Institutes that were offered in 1970 through an indepth examination of participant information.

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CHAPTER I

PROJECT OVERVIEW

The National Science Foundation (NSF) has supported its Summer Institute (SI) program for secondary school teachers for nearly two decades. From a very modest beginning of one institute held at the University of Washington in 1954 with a total expenditure of $10,000, the SI program has expanded into a multimillion dollar operation. Most of the institutes have been devoted to natural sciences and/or mathematics, but a relatively small number of institutes in social sciences have been included since 1961.

It is not the purpose of this study to review the history, content, or operation of the SI program.[1] However, some brief comments are in order relative to the general orientation and objectives of the program. As a very general observation, the SIs might be characterized as an exceedingly varied group from several perspectives. Each SI is an individualized operation, with the director having a great deal of freedom within general NSF guidelines. There is no standardized list of prerequisites or requirements, no common procedure for granting credits, and no single difficulty level for institute content. Each institute focuses on targets which it chooses; different institutes are targeted toward different needs. Whatever the specific needs of an individual teacher or whatever his position in the secondary educational structure, the assortment of institutes is likely to include at least one that is directed toward needs which he considers

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[1]For a detailed account of the SI program and its history, the reader is referred to: Kreighbaum H., and Rawson, H., An Investment In Knowledge, New York, New York University Press, 1969. Several of the comments in this section are based on information from this publication.

important. Summer Institutes can be classified in a number of ways. Those in which participants study for a single summer are called "Unitary"; those designed primarily to offer a coordinated sequence of summers in which qualified participants return to successive institutes are classed as "Sequential." Some institutes are exclusively for senior high teachers, others for junior high teachers, and still others combine the two types of teachers. Some institutes concentrate on a single discipline such as Chemistry and others focus on combinations of disciplines such as General Science or Multiple Fields.

With all this diversity, there are still some common characteristics inherent within the SI program. Key emphasis of all institutes has been on improving the teaching of science (broadly defined, including mathematics and the social sciences). The institutes stress subject matter; that is, fundamentals in the discipline are stressed rather than pedagogy. NSF officials have generally held the view that typical graduate and undergraduate science courses emphasize content slanted toward research rather than teaching-oriented careers. Thus, one of the underlying objectives of the SI program is the inclusion of content specially designed to aid teachers in teaching their courses.

The SI program, as presently conducted, serves the participants in the following four major ways. These may be considered a direct reflection of the general goals of the program. They are not necessarily distinct or independent objectives and it should not be inferred that all or even any given institute is necessarily designed to incorporate all of the objectives.

1. Updating: SIs offer refresher courses for teachers who were once well prepared, but who for some reason have not kept up with new knowledge in the field.

2. Upgrading: SIs provide basic training for teachers who were not well prepared in the first place. Many teachers teach in two or more areas but have concentrated training in only one, and some have had very little training in any science subjects taught.

3. Reorienting: SIs offer training in teaching new curricula and different courses for teachers who are qualified to teach traditional courses. Certain institutes, the implementation institutes, are oriented toward course content improvement programs.

4. Advanced Training: SIs provide training in science subject matter.

In supporting a complex enterprise such as the SI program with its broad scope, multiple purposes and diversity of content, the NSF has been concerned with the effects of institute attendance upon the participant and his subsequent professional performance. These concerns were substantiated with a request for proposals (RFP) to evaluate the 1970 Summer Institutes.[2] On July 15, 1971, NSF awarded a twelve month contract for the Evaluation of Summer Institutes for Secondary School Teachers of Science and Mathematics to the Center for Educational Research and Services at the University of Toledo. This is the final report of that study to the National Science Foundation.

Project Design

During the summer of 1970 there were 445 NSF-supported SIs for secondary school teachers with approximately 19,000 participants attending. A follow-up study was conducted in which selected participants were asked to respond to a questionnaire 13 to 16 months after they had returned to their classrooms. This permitted each participant one full school year and the beginning of a

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[2]RFP No. 71-130, Evaluation of Summer Institutes for Secondary School Teachers of Sciences and Mathematics Programs, National Science Foundation April 9, 1971.

second academic year after attending the Institute to implement change within the school and/or classroom.

The purpose of the follow-up study was to evaluate the effects institute attendance had upon the participants and their subsequent professional performance in the classroom. Additional objectives included a desire to obtain an inventory of educational needs as perceived by classroom teachers and an attempt to determine the extent to which the participants' institute experiences matched their perceived educational needs.

Because of the large number of participants, limited time and many other constraints on a follow-up study, procedures had to be employed for efficient questionnaire administration to a sampling of the 19,000 participants. Based on the type of institute attended, the total population of participants was divided into two groups. One group was composed of participants who had attended institutes from whom information was desired from each participant because of the special features of these institutes. This group was called the Census and represented 93 institutes and 3,694 participants. The second group was composed of participants who had attended institutes from whom information was desired from only a random sample of ten per cent of the participants. This second group was called the Sample, representing 338 institutes and 15,176 participants. There were 1,758 participants selected to receive questionnaires in the Sample, for reasons which are discussed in Chapter II. Participants from each group were sent a questionnaire which was designed and developed by the project staff and NSF representatives.

Questionnaire Development

Questionnaire items were prepared by the project staff and reviewed by NSF staff to ensure that the type of information requested from the participants would accurately reflect the needs of the Foundation.

The development and revision of the questionnaire were the most urgent and extensive tasks for the first three months of the project. Two tryouts of the questionnaire were administered by members of the project staff in 1971 Summer Institutes: one at Western Michigan University with 170 participants in three NSF Institutes and the other at Ohio State University with 106 participants in two NSF Institutes. Results of these tryouts were used by the project staff for subsequent revisions of the questionnaire. A final version of the questionnaire was field tested again with 1971 Summer Institute participants at Drake University and The University of Iowa. These last tryouts were to check specifically on the wording of the directions and the general format of the questionnaire. Throughout this three month period, several joint sessions of the project staff and NSF personnel were held for purposes of questionnaire development and detailed project planning. The final version of the questionnaire was approved by NSF, cleared through the Office of Management and Budget in accordance with federal regulations and assigned the number OMB No. 990S71004 with the approval for use expiring July 31, 1972.

Final Version of the Questionnaire

Since a portion of the Census SIs was designated by NSF as having special curriculum characteristics, Section VII of the questionnaire was designed especially for these participants. Appendix A contains a copy of the questionnaire sent to the participants in institutes having special

curriculum characteristics. All other participants received an identical questionnaire except that Section VII was omitted.

Directions in the questionnaire differed from section to section and participants were reminded to read each set of instructions carefully. The numbers in parentheses on the left side of each page of the questionnaire were for coding purposes and the participants were instructed to disregard them while they responded to the items.

Section I was devoted to demographic data which was used during the analysis for a background description of sub-groups of the Census and Sample. Although data on a few items collected in Section I of the questionnaire could have been obtained from separate records available at NSF, for the sake of efficiency all the necessary descriptive information was collected in one compact section for subsequent computer analyses. This included much additional background data available from no other source.

Section II was concerned with the participants' previous attendance at NSF-supported programs. Its purpose was to focus attention on the background differences between participants in the 1970 Summer Institutes with no previous institute experience and those participants who had attended institutes in earlier years. Three categories of respondents were identified: (1) participants with no previous institute attendance, (2) participants who had attended an Academic Year Institute or more than two previous Summer Institutes, and (3) participants with all other patterns of previous institute attendance. The profiles of these three groups were analyzed for similarities and differences by using the demographic data in Section I for the comparisons.

Section III contained items related to determining the effect of the 1970 Summer Institute in increasing the professional competence of individual

teachers. Items were designed to reflect changes which might have occurred in a participant's professional duties and status that were judged to be directly attributable to his participation in the 1970 Institute. If the participant had attended other institutes prior to 1970, his responses were to reflect the cumulative effect of all institutes attended through the summer of 1970.

Section IV contained a list of generally recognized educational needs suggested by the Foundation and the project staff as applicable particularly to secondary school teachers of science and mathematics. For the twenty-three recognized educational needs listed, the participants were asked to respond in four ways: (1) to designate those needs they believed were particularly important to them as teachers, (2) to indicate those needs they had expected would be dealt with in the 1970 Summer Institutes, (3) to assess which needs the 1970 Summer Institute had actually helped them to meet, and (4) for those who had attended institutes prior to the summer of 1970, to designate which needs their total institute experience had helped them to meet.

In Section V the participant was asked to indicate the extent to which the 1970 Summer Institute had contributed to potential changes in his teaching pattern. Twenty-six items were listed, each rated on a five point Likert-type scale, reflecting growth in professional competence of the individual as distinguished from meeting the perceived needs of his school. The items were of two types: those primarily concerned with attitudes or feelings of increased competence, and those describing specific actions which a teacher might take as a result of a training program. Total scores were then separately derived from the sum of responses to each class of items, labeled "feeling tone" and "action." Average response scores for sub-groups of participants were then compared.

Section VI contained a set of objectives established by NSF for the 1970 Summer Institutes. Each of the 1970 Directors ranked these objectives in their order of importance, first from the viewpoint of their original intentions and second as they interpreted the actual outcomes of the institute. These rankings were made available to the project staff from NSF records. The participants were asked to rank the same set of objectives that their Institute Directors had ranked in 1970, so that a comparison could be made between participants' and Directors' perceptions of the objectives of their mutual institutes.

Section VII was sent only to participants who attended an institute oriented toward one of the new curriculum projects developed with the assistance of NSF support, as designated by the NSF staff. These items were designed especially to elicit the degree of implementation of the new curriculum projects in secondary schools.

Space was provided in the questionnaire for participants to place additional comments that would be beneficial to NSF personnel in planning future institutes. The request for additional remarks from the participants was not a part of the contract with NSF, therefore no attempt was made to summarize or analyze the responses for this report. It was estimated that about thirty per cent of the completed questionnaires contained additional comments.

Overview of the Project Tasks

The primary responsibilities and task involvement of the project staff are outlined in Figure 1. The major tasks are listed in order of their number of weeks into the project. Figure 1 basically summarizes the overall tasks of the project staff and how each member of the project

staff (excluding the secretary) was related to these tasks. Some staff members had primary responsibility for certain tasks, while others were only involved in the tasks to the extent their specialities were needed.

R Primary Responsibility for Task
I Involvement in Task

Project Task	Weeks* in Progress	Project Director	Data Analyst and Sample Designers (2)	Science Specialist	Mathematics Specialist	Graduate Assistant	Computer Specialist
Preliminary Questionnaire Developed	1-3	R	I	I	I	I	
Definition of Background & Demographic Data	1-4	R	R	I	I	I	I
Revision & Development of Final Draft of Questionnaire	4-5	R	I	I	I	I	
Sample Selection	6-9	R	R	I	I	I	I
Progress Report Preparation	8-9	R				I	
Transfer of Data from Participant Information Sheet to IBM Cards	9-14	R	1			I	I
Initial Release of Questionnaire	12	R	I	I	I	I	
First Follow-up of Questionnaire	15	R	I	I	I	I	
Progress Report Preparation	16-17	R				I	
Second Follow-up of Questionnaire	17	R	I	I	I	I	
Third Follow-up of Questionnaire	18	R	I	I	I	I	
Data Transfer from Questionnaires to IBM Cards	20-28	R	I	I	I	I	I
Progress Report Preparation	27-28	R				I	
Computer Analysis	29-34	R	R	I	I	I	I
Data Analysis	35-42	R	R	I	I	I	I
Progress Report Preparation	37-38	R				I	
Final Report Preparation (1st stage)	43-46	R	I	I	I	I	
Progress Report Preparation	45-46	R				I	
Final Report Preparation (2nd stage)	46-52	R	I	I	I	I	

*Week number of the project, e.g., the first task was in progress the 1st through the 3rd weeks inclusive.

Figure 1. Project Staff Responsibilities

CHAPTER II

SELECTION OF POTENTIAL RESPONDENTS

This chapter describes how the potential respondents were selected according to characteristics of the 1970 Summer Institute attended. The institute participants were separated into two major groups: (1) a Census group in which all participants were sent questionnaires, and (2) a Sample group, in which a sample of approximately ten per cent of the participants were sent questionnaires. For this latter group a description of the sampling plan is provided. A sequence of the questionnaire mailing and follow-up notices is also given. Finally, a description of the response patterns by various institute characteristics is provided. In addition to the separation of Census and Sample groups, the major characteristics considered were Unitary vs. Sequential institutes and Level A vs. Level B institutes. The levels of the institutes refer to the prerequisite academic backgrounds of participants selected for attendance. For the purpose of this study, Level A institutes were for participants having a minor or less in the subject area studied and Level B institutes were for participants with at least a major in the subject area. The reader is referred to Appendix B for more details on the operational definition for designating institute level.

Designation of Census and Sample Groups

For the purposes of this study, NSF separated all 1970 SIs into two groups. One group of ninty-three institutes contained 3,694 participants and comprised the Census group of the study. The final designation of the institutes included in the Census was provided by NSF. The Census group included the following institutes:

1. All implementation institutes for NSF-supported course content projects, whose written materials have been commercially available less than three years (except for Engineering Concepts Curriculum Project - ECCP - which expected publication during the year 1970-71)

2. All Social Science institutes

3. All institutes directed at supervisors

4. Institutes directed primarily at junior high school science teachers.

The first three types of institutes listed were clearly different in content than the more common content oriented science and mathematics institutes. The first dealt specifically with implementation of new courses in schools. The second dealt with social science content and was a relative newcomer to the scene with a comparatively small number of institutes. The supervisors institutes were few in number and had a very special emphasis.

The fourth type was included in the Census because NSF has a particular interest in the junior high school science teacher due to the transition that science teaching is undergoing at that level. The content of science at this level has never been conclusively defined, nor are there well established criteria for teacher preparation. The grouping was inexact since teachers could cross the line from junior to senior high, and the institutes were often set up so that some senior high teachers were desired. The group consisted of mostly Earth Science (code: EZ) and General Science (code: GS) institutes. They were selected by the following means. All implementation institutes for IPS, ISCS, and ESCP (three of the NSF-supported course content improvement projects) were included. All Earth Science and General Science Sequential institutes were included. Also included were randomly selected Unitary institutes in the Earth Science and General Science categories. Thus a few in these two broad discipline categories were omitted from the Census and

some were picked up in the Sample population. The latter, those in the Sample, may be viewed as skewed in the direction of being non-implementation and are probably representative only of the non-implementation Unitary institutes.

The participants in the remaining 1970 SIs, those not included in the Census, were to be sampled using a sampling ratio of .10 as requested in the RFP. There were 338 institutes remaining in the population to be sampled from an estimated total of 16,000 participants, or an actual total of 15,176 as determined later. Thus, the estimated sample size was 1,600. It is important to note the distinction between the Census and Sample since not only did one require a random sampling plan, but the distinction has definite implications for analyzing the results. For instance, the Sample was heavily weighted in favor of senior high school science teachers, as well as most junior high and practically all senior high mathematics teachers. It contained relatively few junior high science teachers and practically no social science teachers. There was also a small number of implementation institutes in the Sample but these were for the senior high school NSF-supported curriculum projects developed in the early 1960's.

Sampling Plan

The method of selecting the sample of institute participants of the Sample group who were to receive questionnaires was that of sampling through an intermediate unit.[1] This is basically a two-stage, random sampling

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[1]For a general overview of the procedure see, Wiersma, W. Research Methods in Education: An Introduction, (Philadelphia, J. B. Lippincott, Co., 1960) pp. 268-270. For the reader not interested in the technical aspects of the sampling plan, please advance to p. 15, where the actual application of the plan is discussed.

procedure involving the sampling of an intermediate unit followed by sampling of a primary unit from within the intermediate unit. In this case the intermediate unit was the institute and the participant was the primary unit. The procedure is described here for the interested reader, as it has implications for analysis and the interpretation of results.

A participant's probability of being included in the sample was the product of two probabilities: (1) the probability of his institute being selected (p_1), and (2) the probability of his being selected if his institute was selected (p_2). Institutes were selected with probabilities proportional to size. The selection of the participants (primary units) consisted of the following steps.

1. Determine the number of intermediate units (k) to be included in the sample.

2. Let N equal the number of primary units in the population; and N_i the corresponding value for the ith implementation unit; determine N/K which will be a sampling interval and let N/K = I.

3. List all the intermediate units of the population in some predetermined order (discussed below) and determine the cumulative frequency distribution of the N_i's. Each intermediate unit thus has a number consisting of the sum of its N_i and all preceding N_i's.

4. Select a number (j) at random from numbers 1 through I inclusive. The first intermediate unit is the one in whose cumulative sum j falls. Subsequent intermediate units are selected by determining the numbers j + I, j + 2I, ... , etc. and the units that these numbers "hit" relative to the cumulative sum. When the process has been applied to the entire list, the intermediate units have been selected.

Consider the number of primary units to be selected from the intermediate units. Let n equal the total sample size, in this case estimated to be 1,600 (ten per cent of 16,000), and n_i equal the sample size in the ith intermediate unit. The probability of a primary unit (participant) being selected was $\frac{n}{N} = P_1 \cdot P_2 =$ a constant, in this case .10 according to the procedure discussed above:

$$P_{1i}\ \frac{N_i}{I}=\frac{N_i}{N/k}=\frac{N_i \cdot k}{N}$$

where P_{1i} is the probability of the ith intermediate unit being "hit", that is, probability proportional to size and by definition $P_{2i} = \frac{n_i}{Ni}$. Therefore,

$$\frac{n}{N}=\frac{N_i k}{N} \cdot \frac{n_i}{N_i}=\frac{k \cdot n_i}{N}$$

and since n and k are fixed, n_i is also fixed. The sample size of primary units is the same for all intermediate units, namely n/k. Thus, after the institutes had been selected for the sample an equal number of participants were randomly selected from each selected institute.

Prior to the selection of the institutes for the sample, the population of institutes to be sampled was stratified according to the following three stratifying variables: (1) Sequential or Unitary, (2) Discipline of the institute, (3) Level A or Level B. The advantage of the stratification was that it enhanced proportional representation of the strata in the sample. It also minimized the possibility of relatively small strata being missed entirely.

It was decided that eighty institutes would be selected from the larger population of 338 institutes to be sampled. Eighty institutes required the selection of twenty participants from each institute, a substantial number that would allow for between institute comparisons if desirable. The typical enrollment of an institute was in the 40-50 range. Actually a ten per cent oversample of participants, making a total of twenty-two participants selected from each institute, was included in the sample. The oversample was included in anticipation of some non-response of participants. It was estimated that non-response would likely exceed ten per cent, however, ten per cent seemed

feasible within budgetary constraints, and certainly some non-response could be tolerated. It should be pointed out that oversampling does not change the percentage of response; it simply provides more data. A breakdown of the proportions of institutes in the Sample and in the Population of institutes sampled is provided in Table 2.01, with the NSF code for disciplines provided in parentheses.

TABLE 2.01

Proportions of Institutes in the Population and Sample by Stratifying Variable

	Pop.	Sample		Pop.	Sample
Type			Discipline		
Unitary	.414	.500	(BZ) Biology	.167	.150
			(CH) Chemistry	.089	.075
Seq.	.586	.500	(EN) Engineering (ECCP)	.003	.000
			(EZ) Earth Science	.047	.038
			(GG) Geography	.009	.013
			(GS) General Science	.927	.025
Level			(HI) His & Phil of Science & Math	.006	.000
			(MA) Math	.382	.412
A	.491	.463	(PY) Physics	.068	.061
			(RD) Radiation	.012	.013
B	.509	.537	(XX) Multiple Discipline	.181	.212

An inspection of Table 2.01 reveals that proportions between the Sample and the Population are markedly consistent. Even in the large dichotomous variables, the discrepancy in all cases is less than .09. The largest discrepancy in the discipline strata is .04. Thus it was concluded that the sample was distributed very well proportionally relative to the population from which it was selected.

Schedule of Questionnaire Mailings

The questionnaire development, revision, and printing took place during the summer and early fall of 1971. The initial mailing of the 5,452 questionnaires took place during the week of October 5, 1971. The first follow-up to this mailing, a postcard reminder, was sent the week of October 26. The second follow-up reminder, which included a copy of the questionnaire in the event the first copy had been lost or misplaced, was mailed the week of November 8. The third and final follow-up, a postcard reminder, was mailed to the remaining non-respondents early in the week of November 22. The cutoff point for receiving completed questionnaires was the final mail delivery of December 15, 1971.

Since follow-up reminders and questionnaires crossed in the mail it was impossible to determine exact percentages of returns during each of the mailing periods. However, at the time of the first follow-up approximately 45 per cent of the original 5,452 questionnaires sent had been returned. At the time of mailing the second follow-up the returns were approximately 67 per cent. The final count of returned questionnaires was 4,476 which was 82.10 per cent of the original 5,452 mailed. A chart showing the percentage of questionnaire returns by discipline appears in Appendix C.

Patterns of Respondents and Non-Respondents

Any large survey study involving the mailing of questionnaires inevitably involves some non-response. In the event that there is a substantial percentage of responses, as was the case in this study, non-response does not comprise a serious problem. Nevertheless, in order to ascertain the representativeness of the returned questionnaires, the patterns of non-respondents and respondents relative to institute variables were examined.

Before considering various breakdowns of respondents, a comment concerning "unreachable" participants is in order. The mailing of the questionnaire was approximately fifteen months removed in time from the completion of the 1970 SI. With a large mailing it was expected, for whatever reasons, that not all selected participants would be reached. There were 110 questionnaires returned as undeliverable. This comprised an overall percentage of 2.02 per cent of the participants as unreachable. Of the 110, 46 were in the Sample and 64 in the Census giving percentages of 2.62 per cent and 1.73 per cent unreachable in the Sample and Census respectively. If we consider the remaining 5,342 questionnaire recipients the return of 4,476 represents 83.79 per cent. Considering the Census and Sample separately and basing the returns on 5,342 questionnaire recipients, the rates of return were 85.04 per cent and 81.13 per cent respectively. From this point forward the percentages in this report are based upon the 5,452 participants originally sent questionnaires, since that number of participants, reachable or not, were in the 1970 SI programs.

The real crux of considering patterns of non-response was to determine whether there were certain pockets of non-response that would tend to make the respondents unrepresentative of the original group sent questionnaires. In no way are we implying that respondents comprised a random sample of any original group sent questionnaires. The only use of random sampling in this study was the random sampling of participants for the Sample. The participants selected comprised a random sample of the larger population sampled. Since the Census and the Sample involved markedly different selection methodology, they are discussed separately.

Non-Response in the Census Group

The overall response in the Census was 3,087 questionnaires returned from the mailing of 3,694 for a return rate of 83.57 per cent. The participants in Unitary institutes, who comprised the major portion of the Census, had a return of 83.20 per cent and those in Sequential institutes had a return of 85.00 per cent. The only Sequential institutes in the Census were those in General Science and Earth Science and they consisted primarily of junior high school teachers. Thus, the proportion of non-response was slightly higher in Unitary institutes, being .168 as compared to .150 for Sequential institutes.

Considering Levels A and B in the Census there were 16.04 per cent and 17.60 per cent non-response respectively. Considering the type of institute and level in a four-way breakdown, the proportions of non-response were as follows:

	A	B
Unitary	.163	.184
Sequential	.148	.165

An inspection of the breakdown does not indicate any substantial interaction between type of institute and level. The Level A-Sequential combination had the lowest rate of non-response, and the dichotomies for Level A and Sequential had the lowest rates. A summary of numbers of questionnaires sent and returned for the Census is presented in Table 2.02.

TABLE 2.02

Numbers of Questionnaires Sent and Returned by Level and Type of Institute in the Census

	Level A		Level B	
	Unitary	Sequential	Unitary	Sequential
Sent	2250	512	684	248
Returned	1883	436	558	210

At this point it is well to consider the non-response of special clusters of institutes, since these clusters were considered in the analyses (see Chapter IV). There were three[2] relatively large clusters of institutes in the Census. These subgroups and the proportions of non-response are as follows:

1. Institutes concerned with implementation projects - 2,049 questionnaires sent and 1,725 returned for a non-response proportion of .158.

2. Institutes designed for junior high teachers - 1,920 questionnaires sent and 1,635 returned for a non-response proportion of .148.

3. Institutes oriented to social sciences such as psychology and economics - 756 questionnaires sent and 644 returned for a non-response proportion of .148.

Since the Census did not involve random sampling, it was not appropriate to apply inferential statistics to differences observed in the cells. That is, the tabulations in the cells or categories determined by levels, disciplines, or types represent population response (or non-response) and there

[2]The bases on which these clusters were found are not mutually exclusive, e.g. junior high and implementation institutes could appear in more than one cluster. Therefore, the totals for the three groups exceed the Census totals of questionnaires sent and returned.

was no element of random fluctuation. However, on the basis of the results, there does not appear to be any marked inconsistencies in the response patterns for the Census. Breakdowns by discipline or institute type within the larger classifications of institutes were susceptible to individual factors[3] and do not merit detailed discussion here.

Non-Response In The Sample

The overall response of the Sample was 1,389 questionnaires returned from the mailing of 1,758 for a return rate of 79.01 per cent. The numbers of questionnaires sent to participants in Unitary and Sequential institutes were almost equal, being 878 and 880 respectively. The rates of return were 78.82 per cent and 79.20 per cent for Unitary and Sequential respectively. Thus, the proportions of non-response were .2118 and .2080. This difference in proportions of non-response of .0038 was statistically tested[4] and was found to be not significant at the .05 level of significance (Z = .40, which does not even approach significance at the .05 level). Thus, the difference

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[3]For example, an isolated institute exhibiting poor response may have had its participants unduly affected by a factor such as school reorganization, causing considerable moving instability. Such factors are beyond the control of either the individual institute or the SI program.

[4]The use of inferential statistics was appropriate with the Sample group. The samples comprised random samples of the original group, and thus their measures such as proportions, are statistics (in contrast to parameters in the Census group). As statistics they were subject to random sampling fluctuation, and possessed underlying distributions with location and variance. When comparing two proportions, for example, tested are the hypotheses that the proportions came from populations with equal proportions, (of, in this case, non-response) and that their difference was no more than expected due to random sampling fluctuation. A test which was statistically not significant, indicated that the difference was no more than expected due to random fluctuation given a specified probability, the level of significance.

in proportions of non-response between Unitary and Sequential institutes was no more than expected on the basis of random fluctuation.

Considering non-response in the levels, the proportions were .2506 and .1748 respectively for Levels A and B. This difference of .0758 in the proportions of non-response was statistically significant at the .05 level. Thus the difference in proportions of non-response between the levels was more than can be reasonably ascribed to random fluctuation. When considering the proportions of non-response in a fourfold table we get the following results.

	A	B
Unitary	.243	.169
Sequential	.263	.178

A summary of the numbers of questionnaires sent and returned for the Sample is presented in Table 2.03.

TABLE 2.03

Numbers of Questionnaires Sent and Returned by Level and Type of Institute in the Sample

	Level A		Level B	
	Unitary	Sequential	Unitary	Sequential
Sent	506	308	372	572
Returned	383	227	309	470

A cluster of institutes that assumed considerable importance in the analysis of data was a group called the non-implementation group of the Sample, a subset of the Sample. This group included both Unitary and Sequential institutes. Levels A and B represented the Physical Sciences (including Earth Science and General Science), Mathematics and Multiple

Fields. The rationale for singling out these institutes as a cluster is described in Chapter III.

There were 1,528 questionnaires sent to participants of the non-implementation SIs of the Sample and 1,256 were returned. Thus, the proportion of non-response for this group was .206. Coming from the Sample, this proportion was a statistic. As such it was possible to construct a confidence interval for this proportion. The 95 per cent confidence interval for the proportion was given by the interval .186 to .226. This interval spanned the proportions of non-response for both Sequential and Unitary SIs of the Sample. It spanned the overall proportion of non-response in the Sample which was certainly not surprising since the non-implementation institutes of the Sample comprised the major portion of it. The confidence interval did not span the proportions of non-response for either Level A or Level B of the Sample. Therefore, the differences in proportions of non-response in the non-implementation group of the Sample and these latter two groups are more than what can be attributed to random sampling fluctuation.

Another cluster of institutes was the implementation SIs of the Sample Group. The participants of this cluster received 176 questionnaires and returned 133, for a relatively low non-response proportion of .144. This proportion was not spanned by the confidence interval for the proportion of non-response in the non-implementation group of the Sample.

Summary

In considering the patterns of non-response in terms of the proportions of various subgroups of SIs, there was considerable consistency among the various groups. The confidence interval for the proportion of non-response in the non-implementation group of the Sample did not span all the proportions

of other subsets of the Sample. It should also be noted that the interval did not span any of the proportions of non-response of the Census Group whose proportions were all lower than the lower limit of the interval. These proportions were parameters. As such they did not have variance. However, there was a possibility of the confidence interval spanning the Census proportions. Since the confidence interval, estimating the proportion of the population from which part of the sample was selected, did not span the Census proportions, the hypothesis that the population had a proportion of non-response (hypothetical, of course) equal to any of the Census proportions could not be entertained.

The proportions of non-response for various groups have been reported in this chapter. The reader is left to make his own judgments as to any bias in the patterns of non-response. He is also reminded that due to the large numbers of questionnaires sent, any statistical test resulted in high precision and correspondingly high power. The statistical results, therefore, have small standard errors resulting in very small confidence intervals. It can be inferred that the patterns of non-response were markedly consistent across the groups, and the results of no one group are considered biased due to a heavy concentration of non-response in that group.

The questionnaire that respondents were requested to complete was long and somewhat complex. Respondents were approximately fifteen months removed from the 1970 SI experience. Yet the overall response rate of questionnaires returned exceeded 82 per cent. For a survey of this magnitude that rate of response, in the opinion of the investigators, is noteworthy.

CHAPTER III

OVERVIEW OF THE ANALYSES

The characteristics of the Census and Sample warranted two very different analyses. The Census, as described in Chapter II, included institutes whose participants all received the questionnaire. Thus the proportions, means, etc. are parameters, not statistics. Inferential statistics were not appropriate for these data because there were no inferences to be made. Statistical inference allows the generalization of sample results to the population from which the sample was randomly drawn. However when everyone in the population was included in the data gathered, there was no need for an inference; in fact, the values to be inferred were already in hand.

For the second group, the Sample, statistical inference was appropriate. In this group 10 per cent of the participants of the institutes were randomly selected to receive the questionnaire. Hence, the sample means, proportions, etc. would most likely change if a different random sampling were taken. That is, responses were not obtained from every participant in this group, but responses were obtained from a random sample of these participants. Thus it was possible to estimate the responses of all participants from the values obtained in the random sample.

These estimates could take the form of a point estimate or a confidence interval. A point estimate would be a single mean or proportion which would best estimate the corresponding population parameter. A confidence interval would be a band of points which would have a predetermined probability of spanning the population parameter. The usual probability level chosen for such confidence intervals is .95, i.e., the probability that the confidence interval spans the parameter is .95. Correspondingly, the

parameter would be spanned in 95 per cent of the confidence intervals. The benefit of using a confidence interval is that it allows one to make a probability statement while the use of a single point estimate has a probability of zero of coinciding with the population parameter.

In the Census, the parameters were reported in the analysis. In the Sample a combination of point and interval estimates of the corresponding parameters were reported.

Data Checks

The initial step in the analysis consisted of running utility programs to check the accuracy of the punched cards. These analyses insured that the five cards per subject were properly grouped and sequenced. A few coding or other errors which resulted in illegal data characters were corrected before any group comparisons were made.

Selection of the Reference Group as a Subset of the Sample

To facilitate the interpretation of the large amount of data gathered in this survey, the non-implementation institutes of the Sample were considered a reference group and .95 confidence intervals were established where appropriate. This basic group, or reference group, allowed in-depth comparisons among the institute types. For example, it allowed one to readily see whether Physics institutes as a group had response patterns on some items that distinguished them from the general pattern of the responses on those items.

The reference group was effective because it represented the remaining SIs very well after removal of the implementation, predominately junior high science institutes and social science institutes. This group included institutes from nine disciplines, two levels of participants' academic

backgrounds and both Unitary and Sequential institutes. Thus the reference group was comprised of predominately non-implementation senior high science institutes and junior and senior high mathematics institutes.

Comparisons Among Groups

Several comparisons were made among various types of institutes. Parallel analyses were run on the Census and Sample to find the parameters and estimates of the corresponding parameters respectively. When appropriate, results of the separate comparison groups were compared to the reference group of the Sample.

Results obtained by comparing the following types of institutes are presented in Chapter IV while more detailed discipline and implementation institute results are presented as appendices.

Among the Census institutes:

1. The pooled implementation institutes
2. The Social Science institutes
3. The institutes for supervisors

Among the Sample institutes:

1. The reference group
2. The Level A institutes
3. The Level B institutes
4. Unitary institutes
5. Sequential institutes

It was felt that these types of institutes accurately reflected the composition of the two major groups, the Census and the Sample. These groupings, were identified by NSF as institute types which needed explicit description. The specific discipline and implementation institutes assigned to each group are shown in Table 3.01.

TABLE 3.01

Selected Institutes in the Sample and Census

Group	Disciplines*	Implementation Institutes
Census		
	EZ Earth Science	ECCP Engineering Concepts Curriculum Project
	GG Geography	ESCP Earth Science Curriculum Project
	PS Psychology	ISCS Intermediate Science Curriculum Study
	SE Economics	IPS Introductory Physical Science
	SO Sociology	HPP Harvard Project Physics
		UICSM University of Illinois Committee on School Mathematics
		SRSS Sociological Resources for the Social Studies
Sample		
	BZ Biology	NONE
	CH Chemistry	
	EZ Earth Science	
	GS General Science	
	MA Mathematics	
	PY Physics	
	XX Multiple Fields	

*Engineering, Mathematics, and Physics institutes surveyed in the Census consisted entirely of implementation institutes.

Standard Analysis for Institute Effect

The wealth of information gathered in the questionnaire required systematic consideration so that manageable and interpretable data could be maximized and maintained. The project staff under NSF direction selected the following analyses to be run on each of the aforementioned groups of institutes. The results of these analyses are presented in Chapter IV of this report.

In the demographic data, institute participants were categorized into six categories, men and women in three age classifications (under 30, 30 to 39, and over 39). Respondents also indicated one of four categories for their teaching assignments in 1970-71: senior high, junior high, cannot distinguish, or other level.

To assess the immediate effects of SI attendance on the participants, results obtained from the items of Section III of the questionnaire were examined. Any outcome mentioned in this section was directly attributable to participation in NSF-supported institutes. The number and proportion of participants who experienced each of the listed possible effects are reported. Confidence intervals around these proportions were computed for the basic reference group of the Sample. These intervals spanned the corresponding parameters with a predetermined probability. Such intervals yielded a referent for the point estimates of the Sample subunits. For example, the results of Chemistry institutes in the Sample were compared to these confidence intervals to indicate whether participants of Chemistry institutes had response patterns which differed from the general pattern of responses.

A major portion of the survey, Section IV, dealt with generally recognized educational needs. Examples of these needs were "adapting instruction to slow learners" and "obtaining additional laboratory equipment." Respondents were asked to indicate which of the listed needs were particularly important to their subject area and which of these needs were met by the 1970 Summer Institute or by a cumulative effect of NSF-supported institutes. A ratio of needs met to needs perceived by the participants was computed for each need listed. This was done by dividing the number of participants who indicated that the 1970 SI helped to meet that need by the number of participants who had expected that need to be met. Hence, ratios close to unity indicated that expected needs were being met. Ratios greater than 1.00 indicated that more needs were met than participants had anticipated. Note that confidence intervals were constructed for the basic reference group on results obtained from the items of Section III of the questionnaire.

Section V of the questionnaire was a compendium of possible effects of institute attendance on classroom practices. To achieve some parsimony in data reporting the items were combined into two subscales. The first subscale (Items 65-70, 80-81, 83, 87-89) contained "feeling tone" items such as "increased your ability to judge content for your classes." The second subscale (Items 71-79, 82, 84-86) contained "action" items such as "led you to introduce laboratory experiences into courses that previously contained none."

Scores for these two subscales were reported for each group receiving the standard analysis. Confidence intervals around the scores were computed for the reference group. The corresponding values for all other groups were compared to the confidence intervals of the reference group to determine whether the point estimates were outside the confidence interval.

When a particular subset of institutes departed from the reference group in either direction, it constituted evidence of the differential effects of various institute types.

Additional Analyses for Total and Selected Groups

Besides the standard analyses for the separate types of institutes in the Census and Sample, several additional analyses were performed. These results are presented in Chapter V. For institutes involved with the implementation of specific curriculum projects, frequency distributions were reported for Items 102 to 105, Section VII, to assess the degree to which implementation was taking place.

Additional analyses were conducted to determine whether teachers were actually teaching within the discipline or related areas of the institute that they attended. A cross tabulation of institute participants by discipline and subject(s) taught was prepared to determine the number of teachers teaching the discipline of the institute. The ratio of total number of classes taught in each subject to the number of participants teaching that subject revealed the average class load per teacher. For example, the number of participants in Mathematics institutes teaching mathematics was determined. Also the average number of mathematics classes taught by these teachers was determined. Confidence intervals were constructed for each discipline in the Sample. Confidence intervals were not appropriate for the Census.

The extent of supervisory responsibilities was assessed for the Census, the Sample, and the SU (supervisors) institutes. These analyses indicated whether the appropriate selection techniques were being used in SU institutes. Also SU institutes, implementation institutes, and non-implementation institutes were contrasted based on information obtained

from Item 90 of the questionnaire, "The extent to which your institute training has been used to supervise the math/science programs in your school."

Average grade enrollment was cross-tabulated with the "feeling tone" and "action" items of Section V and Item 33, "moved to another school" to assess the association between school size and these outcomes for the Sample and the Census.

The patterns of previous institute attendance were closely investigated for the several disciplines. Participants were classified according to three levels of previous attendance in NSF supported programs. One group, none, was comprised of teachers who had attended no previous institutes. Participants with a heavy pattern of previous attendance were those who had attended an Academic Year Institute or more than two previous Summer Institutes. All other patterns of previous attendance were termed moderate. Participants in these three categories were then further classified according to age and sex within each separate discipline of the Sample and Census.

Section VI of the questionnaire asked participants to rank order the NSF Summer Institute objectives. The rankings were done twice; first as they had anticipated the institutes prior to attending them, and second, the way they perceived the institutes after they were finished. These rankings were then compared to a similar ranking of these objectives by the institute directors. The results of ten representative institutes were then analyzed to indicate the extent of director-participant agreement. These institutes were selected to represent Sample and Census institutes, Unitary and Sequential institutes, and implementation and non-implementation institutes. The institutes selected also had questionnaire return rates in excess of 90 per cent so that reliable results could be obtained.

The analyses for this study were determined cooperatively by NSF and the project staff. They combined the data and contrasted separate institute types in a manner which maximized the useful information needed for NSF policy decisions. The organization of data was designed to show the effects of various kinds of Summer Institutes that were offered in 1970 and an in-depth examination of their participants. In addition these data could be used as a source for individuals interested in other aspects of NSF institutes and their participants.

CHAPTER IV

RESULTS OF STANDARD ANALYSIS

As described in Chapter III, data from the questionnaire were pooled so that the following groups could be examined and compared:

1. Non-Implementation institutes of the Sample,
2. Level A institutes of the Sample,
3. Level B institutes of the Sample,
4. Unitary institutes of the Sample,
5. Sequential institutes of the Sample,
6. Implementation institutes of the Census,
7. Social Science institutes of the Census, and
8. Supervisors institutes of the Census.

Additional data for the individual implementation groups of the Census, for the Census institutes pooled according to disciplines, and for the Sample institutes pooled according to disciplines are provided in Appendices D-H.

The groups were compared using the following data:

1. Age and sex,
2. Level of 1970 teaching assignment,
3. Immediate effects of institute attendance on participants (Section III of the questionnaire),
4. Immediate effects of institute attendance in helping participants to meet perceived educational needs (Section IV of the questionnaire),
5. Immediate effects of institute attendance on classroom procedures (Section V of the questionnaire).

Comparisons of the Age-Sex Distributions

The age-sex distributions of the non-implementation group of the Sample is shown in Table 4.01. Each cell of the table gives the number of

participants, the per cent this number is of the total group of participants, and the .95 confidence interval. The bottom row of the table shows what per cent of each age group was female.

TABLE 4.01

Age-Sex Distributions of the Non-Implementation (Reference) Group of the Sample

	Under 30	30-39	Over 39	Total
Male	346 (.28) .26-.30	380 (.31) .28-.34	189 (.15) .13-.17	915 (.74) .72-.76
Female	126 (.10) .08-.12	97 (.08) .07-.09	104 (.08) .07-.09	327 (.26) .24-.28
Total	472 (.38) .35-.41	477 (.39) .36-.42	293 (.24)* .22-.26	1242
% Female	(.27)	(.20)	(.35)	

*Because of rounding errors the total per cents may sometimes differ from the sums of per cents in rows or columns.

Table 4.01 shows that approximately three fourths of the participants in the non implementation group of the Sample were male and one fourth were female. About three eights of the participants were under 30 years old, about three eights were between 30 and 39 years old, while only about one fourth were over 39 years old. The distribution of the male participants showed a small peak for the 30-39 group, and a sharp decline for the over 39 group. The female participants, on the other hand, were more evenly distributed among the age groups. This caused a statistical artifact consistently appearing throughout these data, which shows that a much larger proportion of SI participants among the over 39's were female and a smaller proportion of the 30-39 groups were female. The slight dip in number of female

participants in the decade of the 30's, shown in Table 4.01, will be seen as a more pronounced phenomenon later, particularly in the data from mathematics teachers.

The implementation group of the Census (Table 4.02) was different from the non-implementation group of the Sample in many ways. The implementation group had more males - 78 per cent versus the 74 per cent males in the non-implementation group. It was also a much older group with 39 per cent of the participants over 39 years old as compared to only 23 per cent of the non-implementation group in that age group, and with only 24 per cent of the participants under 30 years of age as compared to 38 per cent for the non-implementation group.

TABLE 4.02

Age-Sex Distributions of the Implementation Group of the Census

	Under 30	30-39	Over 39	Total
Male	317 (.19)	516 (.30)	498 (.29)	1331 (.78)
Female	100 (.06)	103 (.06)	170 (.10)	373 (.22)
Total	417 (.24)	619 (.36)	668 (.39)	1704
% Female	(.24)	(.17)	(.25)	

The two distributions were similar only in the per cents of males in the 30-39 range, but the greatest differences were in the per cents of males under 30 (.19 for the implementation group of the Census versus .28 for the non-implementation group of the Sample) and in the per cents of males over 39 (.29 vs. .15). In the Census the largest percentage of females was in the over 39 age group while in the reference group of the Sample the largest percentage was in the under 30 age group.

The sex distributions for the Levels A and B institutes (Table 4.03) of the Sample were similar to that of the reference[1] group. However both age distributions were different from each other and from the age distribution of the reference group. The Level B participants tended to be younger than the reference group participants while the Level A participants tended to be older. Note that the distributions for Levels A and B were similar only in the per cent of males between 30 and 39, the per cent of females between 30 and 39, and the total per cent of participants between 30 and 39.

TABLE 4.03

Age-Sex Distributions of the Levels A and B Groups of the Sample

	Under 30	30-39	Over 39	Total
Male				
Level A	130 (.22)	185 (.31)	113 (.19)	428 (.72)
Level B	242 (.31)	233 (.30)	105 (.14)	580 (.75)
Female				
Level A	51 (.09)	54 (.08)	63 (.11)	168 (.28)
Level B	88 (.11)	53 (.07)	55 (.07)	196 (.25)
Total				
Level A	181 (.30)	239 (.40)	176 (.30)	596
Level B	330 (.43)	286 (.37)	160 (.21)	776
% Female				
Level A	(.28)	(.23)	(.36)	
Level B	(.27)	(.19)	(.34)	

[1]Since .95 confidence intervals were computed for the non-implementation group of the Sample for comparative purposes, that group was referred to as the reference group.

Table 4.04 shows the age-sex distributions of the Unitary and Sequential groups of the Sample. It should be noted that the total percentages of males and females are within the .95 confidence interval of the reference group. The total per cent in the 30-39 age group is also within the .95 confidence interval of the reference group, but the total per cents for the other age groups are different from those of the reference group. The participants of the Unitary group were older than the reference group participants while the participants of the Sequential group were younger than those of the reference group. These differences were primarily among the male members of the under 30 group (.20 Unitary vs .34 Sequential) and the male members of the over 39 group (.22 Unitary vs .10 Sequential). Note the different patterns of distributions of males and females in the Unitary institutes. The largest per cent of males is in the 30-39 group, while this same age group contains the smallest per cent of females. Sequential institutes, on the other hand, show the largest per cent for both sexes below age 30 and a steady decline thereafter. It could be hypothesized that since Sequential institutes tended to offer opportunities for significant progress toward graduate degrees in subject matter, the appeal of these SIs to younger teachers is obvious. They served the function of emphasizing subject matter degrees to younger members of the profession who probably intended to obtain Masters degrees because of increased salary benefits, but who might have otherwise settled for less substantive content.

TABLE 4.04

Age-Sex Distributions of the Unitary and Seque tial Groups of the Sample

	Under 30	30-39	Over 39	Total
Male				
Unitary	139 (.20)	205 (.30)	150 (.22)	494 (.73
Sequential	233 (.34)	213 (.31)	68 (.10)	514 (.74)
Female				
Unitary	68 (.10)	46 (.07)	73 (.11)	187 (.27)
Sequential	71 (.10)	61 (.09)	45 (.07)	177 (.26)
Total				
Unitary	207 (.30)	251 (.37)	223 (.33)	681
Sequential	304 (.44)	274 (.40)	113 (.16)	691
% Female				
Unitary	(.33)	(.18)	(.33)	
Sequential	(.23)	(.22)	(.40)	

The age-sex distribution of the Social Science institutes of the Census is given in Table 4.05. The sex distribution of the Social Science participants was like that of the reference group, but the age distribution was not. The Social Science participants were generally older than the reference group participants with only .23 under 30 (vs .38 for the reference group) and .37 over 39 (vs .23 for the reference group). These age differences occurred in both the male and female groups. Note that more than half of the females were over 39.

TABLE 4.05

Age-Sex Distributions of the Social Science Group of the Census

	Under 30	30-39	Over 39	Total
Male	73 (.18)	132 (.33)	98 (.25)	303 (.76)
Female	20 (.05)	26 (.07)	50 (.13)	96 (.24)
Total	93 (.23)	158 (.40)	148 (.37)	399
% Female	(.22)	(.16)	(.34)	

The Supervisors group of the Census (Table 4.06) was very much different from any of the preceding groups. It was overwhelmingly male (.87 vs .74 for the reference group) and older (.56 over 39 vs .24 for the reference group and .09 under 30 vs .38 for the reference group). Note that almost half of the Supervisors responding to the questionnaire were males over 39 years old.

TABLE 4.06

Age-Sex Distributions of the Supervisors Group of the Census

	Under 30	30-39	Over 39	Total
Male	9 (.08)	37 (.32)	56 (.48)	102 (.87)
Female	1 (.01)	5 (.04)	9 (.08)	15 (.13)
Total	10 (.09)	42 (.36)	65 (.56)	117
% Female	(.10)	(.12)	(.14)	

Table 4.07 shows the age-sex distributions of a sample of all Science, Mathematics, and Social Science teachers from a survey taken during the

1968-69 school year.[3] Comparisons of these distributions to each of the preceding distributions suggests, among others, the following:

1. Over 50 per cent of the Mathematics teachers in the United States (Table 4.07) were under 30 while only 40 per cent of the participants in Mathematics SIs (Table 4.08) were under 30.

2. The total population of Science teachers (Table 4.07) was a younger group than the group of General Science participants in the Census (Appendix, Table D 10), with 46 per cent, 27 per cent, and 27 per cent in the three age groups respectively as compared to 27 per cent, 40 per cent, and 33 per cent.

3. Females between 30 and 39 account for 7 per cent of the Social Science institute participants but only 3 per cent of the total social science teacher population.

Obviously, many other such comparisons between the groups of institute participants and the total teacher population can be made. Of particular interest may be the comparisons between these data and the corresponding data for mathematics and science (non-mathematics) teachers of the reference group of the Sample (Table 4.08). Note that the mathematics and science institute participants have very different age-sex distributions from the mathematics and science teacher population as a whole. Table 4.08 also shows interesting differences between participants of mathematics institutes and participants of science institutes. For example, in mathematics there was a decided peak in the number of male participants in the 30 to 39 age group, while in science there was little difference between the number of males in the 30 to 39 age group and the number of males under 30. In mathematics the 30 to 39 age group contained the fewest females while in science this age group contained the most females. In both mathematics and science the over 39 age groups showed the highest ratios of females to males.

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[3]Hershkowitz, Martin; Characteristics of Discipline/Cross-Discipline Teachers and National Science Foundation Program Participants and Non-Participants: Contract NSF-C565 Technical Report No. 01024.02-2 (p. 150).

TABLE 4.07

Age-Sex Distributions of Science, Mathematics, and Social Science Teachers in the United States During the 1968-69 School Year

	Under 30	30-39	Over 39	Total
Male				
Mathematics	535 (.34)	219 (.14)	225 (.14)	979 (.62)
Science	548 (.35)	359 (.23)	270 (.17)	1177 (.75)
Social Studies	311 (.33)	190 (.20)	154 (.16)	655 (.70)
Female				
Mathematics	273 (.17)	90 (.06)	228 (.15)	591 (.38)
Science	170 (.11)	69 (.04)	154 (.10)	393 (.25)
Social Studies	132 (.14)	26 (.03)	128 (.14)	286 (.30)
Total				
Mathematics	808 (.51)	309 (.20)	453 (.29)	1570
Science	718 (.46)	428 (.27)	424 (.27)	1570
Social Studies	443 (.47)	216 (.23)	282 (.30)	941
Female				
Mathematics	(.34)	(.29)	(.50)	
Science	(.24)	(.16)	(.36)	
Social Studies	(.30)	(.12)	(.45)	

TABLE 4.08

Age-Sex Distributions of the Mathematics and Science Sub-Groups of the Reference Group

	Under 30	30-39	Over 39	Total
Male				
Mathematics	148 (.26)	174 (.31)	78 (.14)	400 (.71)
Science	198 (.29)	206 (.31)	111 (.16)	515 (.76)
Female				
Mathematics	76 (.13)	38 (.07)	53 (.09)	167 (.29)
Science	50 (.07)	59 (.09)	51 (.08)	160 (.24)
Total				
Mathematics	224 (.40)	212 (.37)	131 (.23)	567
Science	248 (.37)	265 (.39)	162 (.24)	675
% Female				
Mathematics	(.34)	(.18)	(.40)	
Science	(.20)	(.22)	(.31)	

Other age-sex distributions are given in Appendix D as follows:

Tables D 1 - D 7 Disciplines of the Sample

Tables D 8 - D 13 Disciplines of the Census

Tables D 14 - D 20 Implementation Groups of the Census

Comparisons of Level of 1970 Teaching Assignment Distributions

Respondents were asked to indicate whether their 1970 teaching assignments were primarily senior high school or junior high school. They were given four choices: junior high school, senior high school, cannot distinguish, and other. Table 4.09 shows the teaching assignment distributions for the eight major groups discussed in this chapter. Each cell contains the number of respondents giving the indicated response

and the per cent that number is of the total number of respondents. In addition, the .95 confidence intervals are given for the reference group (non-implementation group of the Sample). The "omit" column of the table shows how many respondents omitted the items on the questionnaire.

TABLE 4.09

Teaching Assignment Distributions of the Eight Major Analysis Groups

	Junior High	Senior	Level of Assignment High	Cannot Distinguish	Other	Omit
Non-implementation (Sample)	336 .27 (.25-.29)	794 .63 (.60-.66)	41 .03 (.02-.04)	29 .02 (.01-.04)	56 .04 (.03-.05)	
Implementation (Census)	665 .39	903 .52	41 .02	58 .03	58 .03	
Level A (Sample)	222 .37	307 .52	17 .03	18 .03	32 .05	
Level B (Sample)	151 .19	567 .71	29 .04	15 .02	31 .04	
Unitary (Sample)	248 .36	376 .54	22 .03	18 .03	28 .04	
Sequential (Sample)	125 .18	498 .71	24 .03	15 .02	35 .05	
Social Science (Census)	94 .23	275 .68	4 .01	13 .03	21 .05	
Supervisors (Census)	19 .16	74 .63	4 .03	16 .14	5 .04	

None of the last seven groups listed was like the reference group. The Implementation group, Level A group, and Unitary group each had a much higher proportion of junior high school teachers than did the reference group, while the others had lower proportions of junior high school teachers.

Other teaching assignment distributions are given in Appendix E as follows:

Table E 1 Disciplines of the Sample

Table E 2 Disciplines of the Census

Table E 3 Implementation Groups of the Census

Comparisons of the Immediate Effects of Institute Participation on Participant's Duties and Status

Below is a copy of Section III of the questionnaire. The words given in parentheses for each item of the questionnaire have been added and will be used on the tables that follow to help the reader recall the items without referring back to this page.

Section III

The following items refer to changes in your professional duties and status. Indicate the effects which are directly attributable to your participation in the 1970 Summer Institute (SI). (If you have participated in NSF-supported institutes before that time, your answer should reflect the cumulative effect of all institutes attended through the summer of 1970.)

		Yes	No
33.	Moved to another school (Moved)	____	____
34.	Received a different teaching assignment (Dif. Asmt.)	____	____
35.	Received a special purpose teaching assignment, such as a class for exceptional children or children with special needs. (Sp. Asmt.)	____	____
36.	Received a more advanced teaching assignment, i.e. more sophisticated subject matter (Adv. Asmt.)	____	____
37.	Assigned to curriculum supervision (Sup.)	____	____
38.	Became a department chairman or its equivalent (Dept. Ch.)	____	____
39.	Received a reduced teaching load or released time for curriculum development or related activities (Red. Load)	____	____

		Yes	No
40.	Assigned curriculum development without released time, for example, curriculum committee assignment (Curr. Dev.)	____	____
41.	Conducted or otherwise arranged for in-service training of other teachers (In-serv.)	____	____

Table 4.10 gives the distributions of Yes responses to each item of Section III for the eight major analysis groups. Each cell of the table shows the number of respondents marking Yes for the indicated item and the per cent that number is of the total number of respondents. In addition the .95 confidence intervals are given for the reference group (non-implementation group of the Sample).

Much information is contained in the table but only examples of the comparisons that can be made are given below.

For each group, except supervisors, the greatest per cent of positive responses was for Item 36 (received a more advanced assignment), and in all of those cases that per cent fell within the .95 confidence interval for the reference group. In all groups, except Social Science and Supervisors of the Census, the least positive response was on Item 39 (received a reduced teaching load to do curriculum development), and again all of these per cents fell within the .95 confidence interval for the reference group. In fact, with the exceptions again of the Social Science and Supervisors groups, there were almost no significant differences between the reference group and the other groups, and when the differences were significant the per cents were only one point outside of the confidence intervals.

The responses to Items 34, 35, and 36 when combined point out that a very common result of institute attendance was a change in teaching assignment. The responses to Items 39 and 40 when combined suggest

that although they seldom received released time for it, respondents often became involved in curriculum revision as a result of institute attendance.

The Supervisors group was much different from the other groups, but that was to be expected because the participants were basically established in leadership positions before attending the institutes.

TABLE 4.10

Distributions of Yes Responses to Section III Items
for the Eight Major Analysis Groups

Group	Item 33 Moves	34 Dif. Asmt.	35 Sp. Asmt.	36 Adv. Asmt.	37 Cup.	38 Dept. Ch.	39 Red. Load	40 Curr. Dev.	41 In-Serv.
Non-implementation (Sample)	189 .15 (.13-.17)	358 .29 (.27-.31)	156 .12 (.10-.14)	474 .38 (.35-.41)	150 .12 (.10-.14)	243 .19 (.17-.21)	83 .07 (.06-.08)	292 .23 (.21-.25)	131 .10 (.08-.12)
Implementation (Census)	277 .16	631 .37	317 .18	610 .35	294 .17	420 .24	186 .11	516 .30	384 .22
Level A (Sample)	97 .18	159 .29	72 .13	195 .35	61 .11	110 .20	36 .07	117 .21	60 .11
Level B (Sample)	92 .13	199 .28	84 .12	279 .40	89 .13	133 .19	47 .07	175 .25	71 .10
Unitary (Sample)	98 .14	223 .32	106 .15	269 .39	76 .11	124 .18	48 .07	162 .23	87 .13
Sequential (Sample)	109 .16	182 .26	81 .12	268 .38	92 .13	150 .22	48 .07	167 .24	67 .10
Social Science (Census)	37 .09	128 .31	39 .10	157 .39	64 .16	92 .23	46 .10	129 .31	75 .18
Supervisors (Census)	21 .18	46 .39	21 .18	53 .45	53 .45	53 .45	37 .31	41 .35	60 .51

Positive responses to Items 33 through 41 indicated that some concrete changes in professional duties and status were directly attributed to institute attendance. Table 4.11 lists the numbers and per cents of respondents who made no positive responses to Section III items and, presumably, could not attribute any changes in duties and status to institute attendance.

TABLE 4.11

Distributions of Respondents Who Had No Marks in the Yes Column for Section III Items

Group	Number	Per Cent
Census Implementation	371	21.5
Census Non-Implementation	333	24.4
Sample Implementation	32	24.1
Sample Non-Implementation	348	27.7
Total Census	704	22.8
Total Sample	380	27.4

For each of these groups, roughly one fourth of the respondents did not have any marks in the Yes column for Section III items of the questionnaire. Stating this positively, about three fourths of all respondents indicated that institute participation contributed directly to changes in duties or status in the year following attendance.

Further distributions of responses to items in Section III are given in Appendix F as follows:

Table F 1 . Disciplines of the Sample

Table F 2 Disciplines of the Census

Table F 3 Implementation Groups of the Census

Comparisons of the Immediate Effects of Institute Attendance in Helping Participants to Meet Perceived Educational Needs

Section IV of the questionnaire (reproduced below) dealt with generally recognized educational needs. Respondents were asked which of twenty-three listed needs were especially important to their subject areas (Column A); which of the needs they expected the summer institutes to help them meet (Column B); which of the needs the 1970 SIs actually did help them to meet (Column C); and which of the needs the cumulative effect of all institute experience, if they had institute experience prior to the 1970 SI, helped them to meet (Column D). The words in parentheses after each item of the questionnaire have been added and will be used on the tables that follow to help the reader recall the items without referring back to these pages.

Section IV

This section lists numerous generally recognized educational needs. In each of the columns check those needs that apply as follows:

A. Which of the educational needs do you feel are particularly important to you for the teaching of your subject? (Check in column A.)
B. Which needs had you expected the 1970 SI to help you in meeting? (Check in column B.)
C. Which needs did the 1970 SI actually help you in meeting? (Check in column C.)
D. Answer this item if you had experience in NSF-supported institutes prior to the 1970 SI.
Which needs did your total institute experience actually help you in meeting? (Check in column D.)

		A Your needs in teaching the subject	B Your Expec-tations for the SI	C Your needs which the 1970 SI helped to meet	D Cumula-tive Effect
42	Individualizing learning (Indv.)	____	____	____	____
43	Adapting instruction to slow learners (Slow)	____	____	____	____
44	Adapting instruction to high ability students (Able)	____	____	____	____
45	Adapting inductive (discovery) methods of teaching (Induct.)	____	____	____	____
46	Having students become more actively involved in the learning process (Active Invol.)	____	____	____	____
47	Motivating reluctant learners (Motivate)	____	____	____	____
48	Providing more courses in your subject area for non-college bound students (Non-college)	____	____	____	____
49	Providing for continuous progress of students (self-paced learning) (Self-paced)	____	____	____	____
50	Providing content for courses utilizing computers (Computers)	____	____	____	____
51	Using computer-assisted instruction (Comp. Asst. Inst.)	____	____	____	____
52	Up dating subject-matter background (Up-date)	____	____	____	____
53	Introducing teachers to new curriculum developments (Curr. Dev.)	____	____	____	____
54	Relating science and non-science areas through interdisciplinary (Interdiscp.)	____	____	____	____
55	Fusing science courses and/ or science and math courses (Fusing)	____	____	____	____
56	Providing teachers with greater in-depth training (e.g. master's degree, etc.) (In-depth)	____	____	____	____

57	Providing teachers with refresher study (Refresh.)	____	____	____	____
58	Strengthening teachers' backgrounds in allied subjects (Allied Subs.)	____	____	____	____
59	Developing courses specifically designed for local students (Local)	____	____	____	____
60	Providing teachers with actual research experience (Research)	____	____	____	____
61	Utilizing resources outside of the school (Outside Resources)	____	____	____	____
62	Using existing laboratory space and materials more effectively (Effective Lab. Use)	____	____	____	____
63	Obtaining additional laboratory facilities (Add. Lab. Space)	____	____	____	____
64	Obtaining additional laboratory equipment (Add. Lab. Equip.)	____	____	____	____

Table 4.12 shows the distributions of responses to the Section IV items for the reference group. Each entry in Columns A and C shows the per cent of the respondents who checked that need in Columns A and C of the questionnaire. The .95 confidence intervals are given in parentheses. Each entry of Column C/B is the ratio of the number of respondents who checked a need in Column C to the number of respondents who checked that same need in Column B. Confidence intervals were not appropriate for these entries. These ratios indicate how well expected needs were met by the 1970 Summer Institutes. A ratio less than 1.00 indicates the number of respondents who felt that a need was met was less than the number who expected the need to be met, that is, needs expected to be met were not completely met. A ratio greater than 1.00 indicates the number of respondents who felt a need was met, was greater than the number of respondents who expected the need to be met; that is, the institutes met the need better than was anticipated.

TABLE 4.12

Distributions of Responses to Section IV Items for the Non-Implementation (Reference) Group of the Sample

Item	A	C	C/B
42 (Indv.)	.64 (.61-.67)	.24 (.22-.26)	.85
43 (Slow)	.51 (.48-.54)	.12 (.10-.14)	.61
44 (Able)	.58 (.55-.61)	.41 (.38-.44)	.98
45 (Induct.)	.59 (.56-.62)	.36 (.33-.39)	.89
46 (Active Invol.)	.66 (.63-.69)	.32 (.29-.35)	.83
47 (Motivate)	.58 (.55-.61)	.16 (.14-.18)	.61
48 (Non-college)	.35 (.32-.38)	.08 (.07-.09)	.66
49 (Self-paced)	.37 (.34-.40)	.11 (.09-.13)	.76
50 (Computers)	.21 (.19-.23)	.11 (.09 .13)	.76
51 (Comp. Asst. Inst.)	.16 (.14-.18)	.08 (.07-.09)	.83
52 (Up-Date)	.67 (.64-.70)	.64 (.61-.67)	1.00
53 (Curr. Dev.)	.45 (.42-.48)	.33 (.30-.36)	.87
54 (Interdiscp.)	.33 (.30-.36)	.13 (.11-.15)	.87
55 (Fusing)	.33 (.30-.36)	.19 (.17-.21)	.98
56 (In-Depth)	.60 (.57-.63)	.59 (.56-.62)	.95
57 (Refresh.)	.54 (.51-.57)	.54 (.51-.57)	1.00
58 (Allied Subs.)	.46 (.43-.49)	.39 (.36-.42)	.98
59 (Local)	.22 (.20-.24)	.08 (.07-.09)	.78
60 (Research)	.25 (.23-.27)	.21 (.19-.23)	.97
61 (Outside Resources)	.32 (.29-.35)	.18 (.16-.20)	.99
62 (Effective Lab. Use)	.38 (.35-.41)	.20 (.18-.22)	.84
63 (Add. Lab. Space)	.23 (.21-.25)	.06 (.05-.07)	.79
64 (Add. Lab. Equip.)	.28 (.26-.30)	.10 (.08-.12)	.98

Most commonly checked in Column A of the questionnaire was the need to up-date subject matter background (Item 52). Sixty-seven per cent of the respondents checked this need. Sixty-four per cent felt that this need was met by the 1970 SIs. The ratio 1.00 in Column C/B indicates that the 1970 SIs met the need as expected.

The second ranked need in Column A was that of having students become actively involved in the learning process (Item 46). This need was not met as well by the 1970 SIs, as indicated by the .32 in Column C nor was it met as well as expected as indicated by the .83 in Column C/B. Also ranked high as needs were those of providing teachers with greater in-depth training (Item 56) and individualizing learning (Item 42).

The needs met most by the 1970 SIs were those listed in Items 52, 56, and 57 as indicated by the Column C responses of .64, .59, and .54, respectively.

Table 4.13 shows the distributions of responses to Section IV items for the implementation group of the Census. The greatest need perceived by the respondents of this group was the need to have students become actively involved in the learning process (Item 46). The response to this item (.74) was significantly greater than the response of the reference group. Individualizing instruction (Item 42) and using inductive methods (Item 45) were the next most commonly checked needs. In both cases the responses were higher than that of the reference group. Computers (Item 50) and computer assisted instruction (Item 51) were checked least.

TABLE 4.13

Distributions of Responses to Section IV Items
for the Implementation Group of the Census

Item	A	C	C/B
42 (Indv.)	.69	.45	1.02
43 (Slow)	.53	.31	.90
44 (Able)	.51	.39	1.05
45 (Induct.)	.65	.58	1.06
46 (Active Invol.)	.74	.63	1.01
47 (Motivate)	.61	.35	.85
48 (Non-college)	.37	.20	.92
49 (Self-paced)	.43	.26	.95
50 (Computers)	.16	.10	.93
51 (Comp. Asst. Inst.)	.13	.08	.99
52 (Up-Date)	.58	.50	1.00
53 (Curr. Dev.)	.53	.54	1.05
54 (Interdiscp.)	.35	.24	1.05
55 (Fusing)	.33	.18	1.04
56 (In-depth)	.39	.29	.96
57 (Refresh.)	.47	.40	1.04
58 (Allied Subs.)	.43	.35	1.00
59 (Local)	.24	.14	.98
60 (Research)	.23	.16	.93
61 (Outside Resources)	.35	.23	1.19
62 (Effective Lab. Use)	.42	.31	1.02
63 (Add. Lab. Space)	.27	.12	1.01
64 (Add. Lab. Equip.)	.36	.23	1.21

Column C shows that institute attendance most helped the respondents meet the needs given in Items 46 and 45 and least helped them with the needs listed in Items 50 and 51. The ratios in Column C/B are almost all near 1.00 indicating that the institutes met the participants' needs as expected. Generally speaking, the ratios were higher than the corresponding ratios for the reference group.

The distributions of responses for the remaining six major groups are given in Tables 4.14-4.19. The Column A distributions were very much alike and similar to the two preceding distributions. Items 42 (Individualizing), 45 (Adapting inductive methods), 46 (Active involvement), and 52 (Up-dating subject-matter backgrounds) were among the six most chosen items for each group. The only striking difference among the items picked most was Item 53 (Introducing teachers to new curriculum developments) which was the item picked most by the Supervisors group, but was not in the top five for any other group.

With respect to Column C, most of the groups checked Items 52 (Up-dating subject-matter backgrounds), 56 (Greater in-depth training), and 57 (Refresher study) as the needs the institutes met most. The Social Science group checked Item 58 (Strengthened backgrounds in allied subjects) more frequently than Item 56. The Supervisors and Implementation groups of the Census checked Items 45 (Adapting inductive methods), 46 (More active involvement), and 53 (Introducing new curriculum developments) more than any other items. These top three choices were completely different from the top three choices of the other groups.

The reader may make many other comparisons among the distributions of responses to items in Section IV given above and in the following tables which are in Appendix G.

Tables G 1 - G 7 Disciplines of the Sample

Tables G 8 - G 14 Disciplines of the Census

Tables G 15 - G 20 Implementation Groups of the Census

It should be noted that marked differences occurred in perceived needs of teachers in their classrooms and in the needs which institutes met according to disciplines of the institutes. Many of the responses such as emphasis on laboratory techniques in the laboratory science institutes and specific emphasis on curriculum projects in each of the implementation institutes were to be expected. There were, however, many not so obvious needs and expectations of each discipline group, and detailed studies by those with specialized interests would be well worth the effort.

TABLE 4.14

Distributions of Responses to Section IV Items for the Level A Group of the Sample

Item	A	C	C/B
42 (Indv.)	.65	.25	.84
43 (Slow)	.54	.14	.56
44 (Able)	.53	.37	.95
45 (Induct.)	.61	.36	.82
46 (Active Invol.)	.68	.34	.80
47 (Motivate)	.60	.19	.59
48 (Non-college)	.34	.08	.57
49 (Self-paced)	.39	.11	.66
50 (Computers)	.15	.04	.59
51 (Comp. Asst. Inst.)	.13	.04	.64
52 (Up-Date)	.63	.62	.99
53 (Curr. Dev.)	.46	.34	.87
54 (Interdiscp.)	.33	.13	.81
55 (Fusing)	.33	.19	1.01
56 (In-depth)	.54	.53	.95
57 (Refresh.)	.56	.57	1.01
58 (Allied Subs.)	.48	.42	.99
59 (Local)	.26	.09	.68
60 (Research)	.28	.22	.96
61 (Outside Resources)	.36	.24	.97
62 (Effective Lab. Use)	.40	.23	.85
63 (Add. Lab. Space)	.23	.07	.77
64 (Add. Lab. Equip.)	.28	.12	1.07

TABLE 4.15

Distributions of Responses to Section IV Items for the Level B Group of the Sample

Item	A	C	C/B
42 (Indv.)	.63	.23	.87
43 (Slow)	.50	.11	.68
44 (Able)	.62	.45	.99
45 (Induct.)	.58	.36	.96
46 (Active Invol.)	.65	.30	.87
47 (Motivate)	.57	.13	.62
48 (Non-college)	.36	.08	.77
49 (Self-paced)	.35	.11	.86
50 (Computers)	.26	.16	.81
51 (Comp. Asst. Inst.)	.19	.12	.90
52 (Up-Date)	.67	.65	1.01
53 (Curr. Dev.)	.44	.33	.87
54 (Interdisc.)	.32	.12	.93
55 (Fusing)	.33	.18	.95
56 (In-depth)	.65	.64	.96
57 (Refresh.)	.51	.52	.99
58 (Allied Subs.)	.45	.36	.97
59 (Local)	.18	.07	.92
60 (Research)	.24	.19	.99
61 (Outside Resources)	.20	.14	1.02
62 (Effective Lab. Use)	.36	.18	.84
63 (Add. Lab. Space)	.23	.05	.81
64 (Add. Lab. Equip.)	.28	.09	.90

TABLE 4.16

Distributions of Responses to Section IV Items for the Unitary Group of the Sample

Item	A	C	C/B
42 (Indv.)	.63	.25	.87
43 (Slow)	.52	.14	.64
44 (Able)	.56	.40	.98
45 (Induct.)	.60	.40	.88
46 (Active Invol.)	.68	.38	.84
47 (Motivate)	.58	.17	.61
48 (Non-college)	.34	.08	.73
49 (Self-paced)	.39	.12	.83
50 (Computers)	.16	.06	.76
51 (Comp. Asst. Inst.)	.14	.06	.81
52 (Up-Date)	.67	.60	1.00
53 (Curr. Dev.)	.45	.35	.91
54 (Interdiscp.)	.32	.13	.84
55 (Fusing)	.30	.16	.92
56 (In-depth)	.48	.42	.92
57 (Refresh.)	.52	.51	1.01
58 (Allied Subs.)	.45	.34	.98
59 (Local)	.24	.11	.87
60 (Research)	.25	.21	1.04
61 (Outside Resources)	.33	.22	1.04
62 (Effective Lab. Use)	.40	.26	.95
63 (Add. Lab. Space)	.23	.07	.82
64 (Add. Lab. Equip.)	.30	.12	.99

TABLE 4.17

Distributions of Responses to Section IV Items for the Sequential Group of the Sample

Item	A	C	C/B
42 (Indv.)	.64	.24	.85
43 (Slow)	.50	.10	.64
44 (Able)	.60	.44	1.00
45 (Induct.)	.60	.34	.91
46 (Active Invol.)	.65	.29	.86
47 (Motivate)	.56	.14	.65
48 (Non-college)	.36	.08	.64
49 (Self-paced)	.35	.11	.74
50 (Computers)	.25	.13	.78
51 (Comp. Asst. Inst.)	.18	.09	.81
52 (Up-Date)	.66	.66	1.01
53 (Curr. Dev.)	.46	.35	.88
54 (Interdiscp.)	.32	.13	.93
55 (Fusing)	.35	.21	1.03
56 (In-depth)	.68	.70	.98
57 (Refresh.)	.54	.55	1.00
58 (Allied Subs.)	.47	.42	1.00
59 (Local)	.20	.05	.69
60 (Research)	.26	.10	.84
61 (Outside Resources)	.31	.15	.95
62 (Effective Lab. Use)	.37	.17	.77
63 (Add. Lab. Space)	.25	.05	.78
64 (Add. Lab. Equip.)	.29	.09	.98

TABLE 4.18

Distributions of Responses to Section IV Items for the Social Science Group of the Census

Item	A	C	C/B
42 (Indv.)	.66	.36	.93
43 (Slow)	.44	.16	.83
44 (Able)	.48	.42	1.16
45 (Induct.)	.63	.48	.93
46 (Active Invol.)	.73	.57	.97
47 (Motivate)	.55	.27	.92
48 (Non-college)	.29	.11	.73
49 (Self-paced)	.36	.13	.65
50 (Computers)	.09	.04	.94
51 (Comp. Asst. Inst.)	.10	.05	1.57
52 (Up-date)	.68	.69	1.02
53 (Curr. Dev.)	.51	.47	.97
54 (Interdiscp.)	.32	.21	.95
55 (Fusing)	.12	.11	1.05
56 (In-depth)	.43	.41	.98
57 (Refresh.)	.51	.55	1.03
58 (Allied Subs.)	.53	.55	1.13
59 (Local)	.25	.14	.97
60 (Research)	.30	.31	1.07
61 (Outside Resources)	.45	.36	1.09
62 (Effective Lab. Use)	.26	.18	1.01
63 (Add. Lab. Space)	.15	.07	1.04
64 (Add. Lab. Equip.)	.20	.10	1.03

TABLE 4.19

Distributions of Responses to Section IV Items for the Supervisors Group of the Census

Item	A	C	C/B
42 (Indv.)	.66	.40	1.15
43 (Slow)	.50	.34	1.21
44 (Able)	.58	.39	.96
45 (Induct.)	.66	.49	1.26
46 (Active Invol.)	.67	.48	1.06
47 (Motivate)	.58	.28	.97
48 (Non-college)	.44	.27	1.00
49 (Self-paced)	.42	.25	1.07
50 (Computers)	.47	.47	.92
51 (Comp. Asst. Inst.)	.33	.35	.89
52 (Up-date)	.58	.36	.88
53 (Curr. Dev.)	.69	.61	1.00
54 (Interdisep.)	.43	.22	1.08
55 (Fusing)	.36	.16	1.12
56 (In-depth)	.41	.16	.73
57 (Refresh.)	.40	.19	.96
58 (Allied Subs.)	.41	.24	1.08
59 (Local)	.20	.14	.94
60 (Research)	.20	.11	1.44
61 (Outside Resources)	.35	.21	1.47
62 (Effective Lab. Use)	.35	.22	1.08
63 (Add. Lab. Space)	.31	.17	1.05
64 (Add. Lab. Equip.)	.29	.24	1.27

Comparisons of the Immediate Effects of Institute Attendance on Classroom Procedures

Section V, reproduced below, measured the effects of institute attendance on classroom practices. The items were combined into two subscales. One subscale contained "feeling tone" items (Items 65-70, 80, 81, 83, 87-89); the second subscale contained "action" items (Items 71-79, 82, 84-86). The responses Negligible or none, Little, Moderately, Considerably, and A Great Deal were assigned numerical values 1-5 respectively. The score for each respondent on each subscale was the sum of the numerical values assigned to the items of the subscale. The group score on each subscale was the arithmetic mean of the respondents' scores in the respective subscale.

SECTION V

For each item check the one and only one response which best indicates the extent to which your participation in institute(s) has contributed to that result.

(THE DESIGNATION OF MATH/SCIENCE IN THE ITEMS DESIGNATES THE AREA(S) STUDIED BY YOU IN YOUR INSTITUTE (E.G., IF YOU STUDIED ECONOMICS IN THE INSTITUTE, THIS IS THE AREA UNDER CONSIDERATION). INTERPRET THE WORD LABORATORY IN THE BROAD SENSE TO COVER YOUR DISCIPLINE. ALL QUESTIONS CONCERNING YOUR CLASSROOM INSTRUCTION RELATE TO THE PERIOD BEGINNING FROM FALL 1970 TO THE PRESENT.

		NEGLIGIBLE OR NONE	LITTLE	MODERATELY	CONSIDERABLY	A GREAT DEAL
65	increased your math/science knowledge, directly related to the math/science you teach	—	—	—	—	—
66	increased your math/science knowledge	—	—	—	—	—
67	increased your professional competence in teaching math/science	—	—	—	—	—
68	increased confidence in your ability to present math/science	—	—	—	—	—
69	increased your ability to judge content for your classes	—	—	—	—	—
70	increased knowledge of new teaching techniques	—	—	—	—	—
71	led you to implement new teaching techniques in your classes	—	—	—	—	—
72	increased your stimulation of student interest in math/science	—	—	—	—	—
73	increased your effectiveness in classroom teaching	—	—	—	—	—
74	enabled you to teach units or content not previously taught by you in existing courses	—	—	—	—	—
75	led you to introduce new units and topics into existing courses	—	—	—	—	—
76	led you to introduce laboratory experiences into courses that previously contained none	—	—	—	—	—
77	led you to add additional laboratory demonstrations, techniques, or experiments to existing laboratory courses	—	—	—	—	—
78	led you to modify laboratory demonstrations, techniques, or experiments in existing laboratory courses	—	—	—	—	—
79	led you to delete portions of content previously included in your courses	—	—	—	—	—
80	increased your enthusiasm for teaching math/science	—	—	—	—	—
81	increased your ability to individualize the math/science instruction for your students	—	—	—	—	—
82	increased the individualization of math/science instruction for your students	—	—	—	—	—
83	increased your feeling of personal accomplishment in successfully having completed the institute	—	—	—	—	—
84	led you to increase your personal study of new math/science programs	—	—	—	—	—
85	led you to increase your membership in professional organizations	—	—	—	—	—
86	led you to increase your active participation in professional organizations	—	—	—	—	—
87	increased your influence on other math/science teachers in your school with respect to subject-matter competence	—	—	—	—	—
88	increased your influence on other math/science teachers in your school with respect to teaching techniques	—	—	—	—	—

89 increased your influence on other math/science teachers in your school with respect to implementing new curriculum

The distributions of responses to items for the eight major analysis groups are given in Table 4.20. The .95 confidence intervals are also given for the non-implementation group of the Sample (reference group).

TABLE 4.20

Distributions of Respondents to Section V Items for the Eight Major Groups

Group	Feeling Tone	Action
Non-implementation (Sample)	40.26 (39.76-40.76)	35.38 (34.85-35.91)
Implementation (Census)	41.50	39.61
Level A (Sample)	40.39	35.88
Level B (Sample)	40.16	34.99
Unitary (Sample)	39.56	35.74
Sequential (Sample)	41.12	35.63
Social science (Census)	38.33	36.64
Supervisors (Census)	42.78	39.51

It should be noted that the "feeling tone" subscale contains twelve items while the "action" subscale contains thirteen items. Since however, in all cases the "feeling tone" score is higher than the "action" score, it is safe to say that the institutes had a greater effect on the confidence, judgment etc., of the respondents than on the actions of introducing new materials, methods, etc. However, a glance at Table H 1 in Appendix H will show that the Mathematics institute participants were significantly lower than all other Sample subgroups on the "action" score; since mathematics

participants constituted 46 per cent of the Sample, the action score for the entire Sample is considerably depressed. It should be noted that the items relating to laboratory experiences may not have been perceived by Mathematics participants as being applicable to them therefore their "action" scores may not be comparable to other groups.

The Implementation, Sequential, and Supervisors groups were significantly higher in "feeling tone" scores than the reference group with the Supervisors group ranked highest of all. The Implementation, Social Science, and Supervisors groups were higher in "action" scores than the reference group with the Implementation group ranked highest of all. The Social Science group was the only group that was lower than the reference group in "feeling tone" score, while no group was lower than the refer nce group on the "action" score. Further distributions of responses to the item are given in Appendix H.

Table H 1 Disciplines of the Sample

Table H 2 Disciplines of the Census

Table H 3 Implementation Groups of the Census

CHAPTER V

ADDITIONAL ANALYSES FOR SELECTED GROUPS

In Chapter IV, tables of data were presented which showed basic comparisons of various institute groups with respect to response data obtained from Sections I, III, IV and V of the questionnaire. Chapter V is concerned with comparisons of major groups such as Census, Sample, implementation, and institute disciplines, with the data from Sections II, III, V, VI and VII, but does not attempt to compare all possible combinations of the data. In each case, one demographic feature was used to categorize the data from a specific section, e.g., the ratio of the number of classes taught to the institute discipline.

Impact of Implementation Institutes

One of the criteria used in designating the implementation institutes of the Census was that the institute content be centered on the implementation of a curriculum project. Section VII of the questionnaire was designed specifically for participants of such institutes. To facilitate the reader's reference to the original questions in Section VII, that page of the questionnaire has been included below. The right column includes the Section VII abbreviations that are used in Table 5.01.

SECTION VII

	According to NSF records, you attended one of the institutes which was oriented towards one of the new curriculum projects. Please supply the following information about that particular institute.	Abbreviations of item designations shown in Table 5.01
102	How much of the institute was devoted to the project?	(Institute Treatment)
	_____ 75 per cent or more	75%+
	_____ 50 per cent - 75 per cent	50-75%
	_____ less than 50 per cent	Under 50%

103	Has the curriculum project studied in the institute been implemented in your classroom?	(Extent of Implementation)
_____	Yes	Yes
_____	No, not the entire curriculum but substantial portions of materials, approaches, or ideas have been implemented.	Parts
_____	No, but it has been implemented in my school.	In the School - not class
_____	No, but there are plans to implement it in my classroom next year.	Plan to - class
_____	No, but there are plans to implement it in my school next year, but perhaps not in my classroom.	Plan to - school
_____	No, and at the time it looks as though we will not be adopting the curriculum project.	No Plans - school
_____	Other (please explain)	Other
104	If your school has implemented the curriculum project, when was it introduced?	(Dates of Implementation)
_____	1968-1969 or earlier	68-69 or earlier
_____	1969-1970	69-70
_____	1970-1971	70-71
_____	1971-1972	71-72
105	What was your main objective for selecting this particular institute? Check only one response.	(Reason for Attendance)
_____	I had not yet taught in the curriculum project but was expected to do so in the future.	Expected to teach it
_____	I had been teaching in the curriculum project without formal background in it.	Already teaching it
_____	I wanted to obtain information which would help in deciding the suitability of the curriculum project for adoption in our school.	Help decide on adoption
_____	I needed the background necessary for leadership in our school system.	Background to lead implementation
_____	Other specify:	Other

The number of responses in each category for the items of Section VII are shown in Table 5.01. These items are indicated by their numbers in the questionnaire. The tabulations are categorized according to the curriculum project emphasized in the institute. These data represent the relative impact of the implementation institutes of the Census on subsequent implementation of curricula in schools.

TABLE 5.01

Participants' Responses to Section VII Items for Implementation Institutes of the Census Group

Item Number and Designation	Curriculum Project Emphasized*							
	ECCP	ESCP	ISCS	IPS	HPP	UICSM	SRSS	Total
Number of Responses	117	316	79	285	371	320	119	1607
102 (Institute Treatment)								
75%+	104	156	67	227	343	288	51	1236
50-75%	9	90	11	19	25	21	23	198
Under 50%	2	61	0	4	1	4	42	114
No Response	2	9	1	35	2	7	3	59
103 (Extent of Implementation)								
Yes	27	148	50	138	185	144	39	731
Parts	27	96	6	46	89	78	47	389
In the School - not class	4	5		11	9	8	1	38
Plan to - class	3	5	2	4	6	3	4	27
Plan to - school	3	3	1	1	3	0	1	12
No Plans - school	32	33	13	33	38	52	9	210
Other	18	13	6	17	30	28	12	124
No Response	3	13	1	35	11	7	6	76
104 (Dates of Implementation)								
68-69 or earlier	9	66	1	65	27	30	--	198
69-70	8	46	10	25	30	23	7	149
70-71	16	66	28	60	115	116	47	448
71-72	5	13	15	18	58	12	11	132
No Response	79	125	25	117	141	139	54	680
105 (Reason for Attendance)								
Expected to teach	19	76	18	61	72	82	21	349
Already teaching it	4	72	8	45	23	15	16	183
Help decide on adoption	55	64	34	75	166	128	37	559
Background to lead implementation	14	35	9	24	62	38	24	206
Other	19	53	9	40	36	52	16	227
No Response	6	16	1	40	10	5	5	83

* See page 28 of Chapter Three for complete titles of curriculum projects.

Considering the total group of implementation institutes in the Census the following may be concluded:

1. The institutes stressed the projects with which they were identified.

2. Two-thirds of the participants were using at least part of the project stressed at the institute.

3. Fifty per cent of the participants had converted to the respective curriculum project by the end of the 1970-71 school year. An additional, eight per cent of the participants were involved in the implementation of the project during the 1971-72 school year.[2]

4. The number of participants who attended institutes for the purpose of attaining information relative to curriculum project adoption decisions was roughly equivalent to the number who were preparing to or had been teaching the project.

In comparing the implementation institutes, the data of Table 5.C1 reveal the following general observation.

1. Most of the participants in the ECCP, ISCS, UICSM, and HPP institutes reported that 75 per cent or more of the institute time was devoted to the project. ESCP institutes tended to concentrate less on implementation of the ESCP project and more on other topics than other implementation institutes.

2. Considering Item 103, participants in the ISCS institutes showed the largest proportion incorporating the entire project in their curricula (50 our of 79). All projects except ECCP had a large group of participants (between two-thirds and three-fourths) who had adopted the project either totally or partially. In the ECCP institutes, however, only about one-fourth adopted the entire program, an equal number did so partially, and another one-fourth did not respond positively about adoption plans at the time the survey was made. No general conclusions about ECCP implementation could be drawn from these responses, because the commercial version of the text did not become available until May, 1971, which left too little time for action to become effective by September of 1971. This publication gap undoubtedly affected the responses.

3. About one-third of the participants in ESCP and IPS institutes reported that their schools had already adopted these projects before the summer of 1970. Less than one sixth of the participants had implemented ISCS prior to attending the institute. The latter may be

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[2]Item 104 was directed toward those who indicated in Item 103 that they had implemented the respective program in their schools or classrooms. This explains the relatively high non-response on Item 104.

explained in part by the fact that the ISCS program was not available commercially until the fall of 1970.

4. In interpreting the data from Item 105 of the questionnaire on "Reason for Attendance", it should be noted that one third or more of the participants in ESCP, IPS and UICSM institutes had either used the project materials or expected to use the program the following fall. Nearly one half of the participants in the ECCP, ISCS and HPP institutes attended to help them decide on the suitability of the curriculum project for their schools.

5. The participants in the SRSS institutes had a high rate of implementation (nearly three fourths) when both total and partial adoption was considered. They tended to resort more to partial adoption than did participants of other project institutes. This partial adoption was consistent with the types of materials offered by the SRSS project.

An analysis was made to determine the relationship between the type of implementation institute attended (Questionnaire Item 101) and the enrollment per grade of the school in which the participant taught. No discernible trends were found.

Classification of Teaching Assignment by the Discipline of the Institute

One matter of concern was the extent to which a participant's subsequent teaching assignment was related to the discipline of the institute attended. The point of consideration was the extent to which the individual taught the discipline studied at the institute. The measure computed was the ratio of number of classes taught in a subject to the number of participants indicating that they taught that subject. The ratio is presented (Tables 5.02-5.08) both in terms of the actual number and its corresponding decimal value. The participants were categorized according to the type of institute attended. Tables 5.02, 5.07 and 5.08 include responses from participants of more than one institute discipline. Tables 5.03 through 5.06 contain data from participants of both the Census and Sample. Table 5.02 contains data only from participants in the Sample, while Tables 5.07 and 5.08 contain data from participants of the Census group.

To help interpret these tables, consider two examples selected from Table 5.05: participants that attended Mathematics institutes. There were 574 respondents in the Sample and among them 527 indicated that they taught mathematics. The number of mathematics classes taught by these 527 respondents was 2,371 giving a ratio of 4.5 classes per respondent. In another example, fifteen of the respondents indicated they taught a total of 19 physics classes for a ratio of 1.3 physics classes per respondent. In a similar manner, the table shows other subjects taught by participants of Mathematics institutes and the ratio of classes per respondent for each subject.

The same procedure was used for Tables 5.02 through 5.08 to determine the various subjects taught and the ratio of classes per respondent for participants attending different types of institutes in the Census and Sample. A general observation of the data indicates that the SI participants were given teaching assignments in a wide variety of subjects even though they attended institutes concentrating on a single curriculum project.

TABLE 5.02

Ratio of the Number of Classes Taught in Each Subject to the Number of Participants Teaching Each Subject in the Biology, Chemistry, and Multiple Fields Institutes of the Sample

Teaching Assignment	Institute Discipline		
	Biology	Chemistry	Multiple Fields
Number of Respondents	213	100	292
Anthropology			5/1 (5.0)
History	2/2 (1.0)		2/1 (2.0)
Social Studies	10/4 (2.5)		8/3 (2.7)
Sociology			
Geography	5/2 (2.5)		1/1 (1.0)
Economics			
Psychology	2/2 (1.0)		
Mathematics	128/34 (3.8)	26/10 (2.6)	306/77 (4.0)
Physics	8/3 (2.7)	68/34 (2.0)	141/86 (1.6)
General Science	169/47 (3.6)	29/10 (2.9)	166/58 (2.9)
Earth Science	53/21 (2.5)	12/6 (2.0)	54/22 (2.4)
Chemistry	18/11 (1.6)	249/76 (3.3)	259/101(2.6)
Biology	552/149(3.7)	27/13 (2.1)	191/67 (2.9)
Integrated Phy. Sci.	24/12 (2.0)	22/10 (2.2)	150/52 (2.9)
Other	50/25 (2.0)	18/11 (1.8)	81/42 (1.9)

TABLE 5.03

Ratio of the Number of Classes Taught in Each Subject to the Number of Participants Teaching Each Subject in the Earth Science Institutes of the Sample and Census

Teaching Assignment	Sample	Census
Number of Respondents	55	791
Anthropology		6/4 (1.5)
History	3/2 (1.5)	18/10 (1.8)
Social Studies		30/14 (2.1)
Sociology		1/1 (1.0)
Geography		40/17 (2.4)
Economics		
Psychology		3/2 (1.5)
Mathematics	19/7 (2.7)	206/92 (2.2)
Physics	3/3 (1.0)	84/49 (1.7)
General Science	48/14 (3.4)	758/231 (3.3)
Earth Science	103/31 (3.3)	1656/510 (3.3)
Chemistry	12/5 (2.4)	140/69 (2.0)
Biology	36/13 (2.8)	473/184 (2.6)
Integrated Phy. Sci.	9/5 (1.8)	263/103 (2.6)
Other	24/11 (2.2)	212/99 (2.1)

TABLE 5.04

Ratio of the Number of Classes Taught in Each Subject to the Number of Participants Teaching Each Subject in the General Science Irstitutes of the Sample and Census

Teaching Assignment	Sample	Census
Number of Respondents	29	844
Anthropology		7/4 (1.8)
History	1/1 (1.0)	93/38 (2.5)
Social Studies		81/39 (2.1)
Sociology		38/18 (2.1)
Geography		36/18 (2.0)
Economics		22/9 (2.4)
Psychology		13/8 (1.6)
Mathematics	30/9 (3.3)	333/127 (2.6)
Physics	4/2 (2.0)	140/78 (1.8)
General Science	57/15 (3.8)	1308/365 (3.6)
Earth Science	9/3 (3.0)	385/149 (2.6)
Chemistry	5/3 (1.7)	143/83 (1.7)
Biology	20/7 (2.9)	435/165 (2.6)
Integrated Phy. Sci.	20/7 (2.9)	667/212 (3.2)
Other	3/3 (1.0)	473/153 (3.1)

TABLE 5.05

Ratio of the Number of Classes Taught in Each Subject to the Number of Participants Teaching Each Subject in the Mathematics Institutes of the Sample and Census

Teaching Assignment	Sample		Census*	
Number of Respondents	574		320	
Anthropology			1/1	(1.0)
History	19/12	(1.6)	18/8	(2.3)
Social Studies	61/18	(3.4)	63/14	(4.5)
Sociology				
Geography	14/6	(2.3)	2/2	(1.0)
Economics	4/3	(1.3)	3/2	(1.5)
Psychology				
Mathematics	2371/527	(4.5)	1298/295	(4.4)
Physics	19/15	(1.3)	2/1	(2.0)
General Science	39/21	(1.9)	39/17	(2.3)
Earth Science	12/6	(2.0)	8/5	(1.6)
Chemistry	19/15	(1.3)	2/1	(2.0)
Biology	80/23	(3.5)	14/6	(2.3)
Integrated Phy. Sci.	12/8	(1.5)	5/2	(2.5)
Other	105/54	(1.9)	87/33	(2.6)

*In the Census all Mathematics institutes were concerned with UICSM, a junior high mathematics course.

TABLE 5.06

Ratio of the Number of Classes Taught in Each Subject to the Number of Participants Teaching Each Subject in the Physics Institutes of the Sample and Census

Teaching Assignment	Sample	Census*
Number of Respondents	94	371
Anthropology		
History	2/1 (2.0)	
Social Studies		3/1 (3.0)
Sociology		9/2 (4.5)
Geography		2/1 (2.0)
Economics		2/1 (2.0)
Psychology		3/2 (1.5)
Mathematics	66/25 (2.6)	285/103 (2.8)
Physics	92/48 (1.9)	686/300 (2.3)
General Science	32/15 (2.1)	125/59 (2.1)
Earth Science	42/13 (3.2)	35/20 (1.8)
Chemistry	103/40 (2.6)	214/94 (2.3)
Biology	18/7 (2.6)	45/28 (1.6)
Integrated Sci., Sci.	38/16 (2.4)	170/77 (2.2)
Other	46/19 (2.4)	150/74 (2.0)

*In the fall of the physics institutes were concerned with the implementation of Project Student Physics, a senior high school physics course.

TABLE 5.07

Ratio of the Number of Classes Taught in Each Subject to the Number of Participants Teaching Each Subject in the Social Science Institutes of the Census

Teaching Assignment	Institute Discipline							
	Economics		Geography		Psychology		Sociology	
Number of Respondents	217		65		66		178	
Anthropology	20/8	(2.5)	7/3	(2.3)	5/4	(1.3)	17/9	(1.9)
History	282/93	(3.0)	48/18	(2.7)	20/12	(1.7)	274/94	(2.9)
Social Studies	187/59	(3.2)	25/8	(3.1)	20/8	(2.5)	173/64	(2.7)
Sociology	37/19	(2.0)	4/1	(4.0)	37/14	(2.6)	143/78	(1.9)
Geography	50/20	(2.5)	53/22	(2.4)	2/1	(2.0)	86/35	(2.5)
Economics	266/134	(2.0)	1/1	(1.0)	3/2	(1.5)	50/25	(2.0)
Psychology	24/12	(2.0)			95/31	(3.1)	35/17	(2.1)
Mathematics	14/6	(2.3)	21/10	(2.1)	5/1	(5.0)	2/1	(2.0)
Physics					2/2	(1.0)		
General Science			70/22	(1.8)	12/4	(3.0)	3/1	(3.0)
Earth Science			7/4	(3.2)	10/4	(2.5)		
Chemistry					7/4	(1.8)	2/1	(2.0)
Biology			18/6	(3.0)	73/18	(4.1)	12/4	(3.0)
Integrated Phy. Sci.	2/1	(2.0)	25/6	(4.2)				
Other	130/44	(2.7)	36/11	(3.3)	24/12	(2.0)	59/22	(2.7)

TABLE 5.08

Ratio of the Number of Classes Taught in Each Subject to the Number of Participants Teaching Each Subject in the ECCP and Supervisors Institutes of the Census

Teaching Assignment	Institutes	
	ECCP	Supervisors
Number of Respondents	117	118
Anthropology	5/2 (2.5)	
History		
Social Studies	15/5 (3.0)	18/4 (4.5)
Sociology		
Geography		
Economics		
Psychology	1/1 (1.0)	
Mathematics	99/32 (3.0)	235/54 (4.4)
Physics	90/44 (2.1)	22/10 (2.2)
General Science	37/17 (2.2)	25/9 (2.8)
Earth Science	12/5 (2.4)	7/2 (3.5)
Chemistry	93/36 (2.6)	31/8 (3.9)
Biology	66/21 (3.1)	26/9 (2.9)
Integrated Phy. Sci.	27/11 (2.5)	20/7 (2.9)
Other	94/41 (2.3)	23/13 (1.8)